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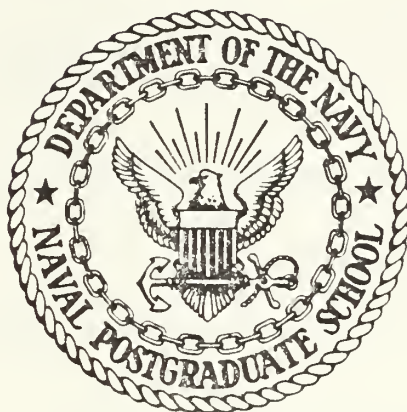
THESIS

AUTOMATION OF THE PAYROLL SYSTEM
OF THE HELLENIC AIR FORCE

by

Harilaos A. Papadopoulos

December 1984

Thesis Advisor:　　　　　　　Paul W. Callahan

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Currently, the payroll for the Hellenic Air Force is computed manually. The author proposes an automated system to compute the monthly payroll for the Hellenic Air Force (consisting of 25000 personnel), and produce the required management reports. Various factors affecting a member's payroll status (pay raise, allowances, retirement, promotion, tax rate, family support, new assignment, etc) are shown. (Continued)

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ABSTRACT (Continued)

A design for a system of programs to provide various reports and update the appropriate master file is included. Also included are a general description of the inputs, purpose, and outputs for each of the main programs of the system, as well as a record layout for the database.

Automation of the Payroll System
of the
Hellenic Air Force

by

Harilaos A. Papadopoulos
Major,Hellenic Air Force

ABSTRACT

Currently, the payroll for the Hellenic Air Force is computed manually. The author proposes an automated system to compute the monthly payroll for the Hellenic Air Force, and produce the required management reports. Various factors affecting a member's pay (both entitlements and deductions) are examined, as well as their relationship to the total system. Sample input forms to submit various changes in a member's payroll status (payraise, allowances, retirement, promotion, tax rate, family support, new assignment, etc.) are shown.

A design for a system of programs to provide various reports and update the appropriate master file is included. Also included are a general description of the inputs, purpose, and outputs for each of the main programs of the system, as well as a record layout for the database.

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I. INTRODUCTION

A. GENERAL

Successful   design and   implementation   of an   automated
payroll system is a hard task   because,first, one has to be
concerned with a great number of details which affect such a
system,and second,the designed software system must be flex-
ible enough to adapt easily with minimum effort to changes
that are frequent to a long living system,such as a payroll
system.

An   even harder job is to design a simple automated
payroll system to be run by inexperienced programmers and
employees,who get in and out of the system frequently,due to
assignments and other obligations usual to military environ-
ments.   Our effort here is tc design a simple automated
payroll system,which will replace the existing manual system
for the Hellenic Air Force.

The very first effort,since our system will replace an
existing manual system,will be to identify all the factors
that affect the monthly payment of a diversity of military
personnel. Secondly,we will try to locate the sources which
determine the change of these factors and to anticipate as
many of them as possible. Finally,we will design a simple
flow of information to the automation office,the transforma-
tion of information to meaningful input for the system,the
set of programs implementing the system,their files and
records,procedures to verify the quality of the product,and
the input-output of the system,   in order to provide
correctly and in time every month the payment of the
personnel.

Our system will be successful if,in the first phase,it implements the monthly payment of the military personnel equally correct as the existing manual system,but with less effort and minimum personnel (programmers) working at the automation office;in a second phase refinement can be undertaken,to further improve the quality,efficiency and effectiveness of the system.

The computer facility which will run the payroll system once a month is assumed to be a conventional computer center. Our description that will follow is going to be language independent and it will be a matter of evaluation of the existing conditions,to chose an appropriate language to implement the automated payroll system.

B. APPROACH AND PERSPECTIVES

In what follows,we will attempt to approach our subject somehow scientifically, this means that our way will be disciplined and we will try to apply the guidelines provided by the Software engineering,in a way adaptive to the subject.

Our designs here can not be exhaustive,since we do not have available any detail on the subject. The designs will be held in system level,but they will be fully expandable and very flexible. So any new requirements,arising in the future,will be easily added to the existing system,without requiring major modifications or completely new designs.

Special effort we will pay to document well our ideas and designs,in a way that will make this complex job understandable to everyone with little familiarity with the particular area. So that,we hope,it will be possible to be used by interested people outside of the specific area or to be continued by writing corresponding programs (code),that will implement the provided ideas.

II. FACTORS OF THE PAYROLL SYSTEM

The success of any automated payroll system,is abso-
lutely dependent on the data that will be input into the
system;the input data,after a specific processing,will give
the required output,which in our case is the correct monthly
payment of the personnel. In order for the results to be
correct,it is absolutly necessary that the used data is
trustful,accurate and complete,otherwise the whole system
will deteriorate with time.

The data which affect the payroll system can be divided
as follow:
1. Personal and family data
2. Service status
3. Loans - deductions

The above data are introduced into the automated system
by completing a specific form (report) which we will call
'FIRST INSERTION',in order to indicate that it is used to
insert a newcomer into the payroll system. Thereafter the
changes that happen to occur in the above three categories,
are used to update the already existing data into the system
for each person,and are transmitted to the automation office
through two other forms (reports),which we will call
'MONTHLY CHANGES' and 'LOANS - DEDUCTIONS'.

In later chapters,the above mentioned data and the three
reports will be analyzed and a specific coding will be
provided,in order for the responsible Directorates or Units
to provide them to the automation office correctly and in
time,to be used there for the production of the monthly
payment.

Following we describe the factors that determine and
affect the monthly payment of the personnel,the sources that

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initiate them and the way the related information will be
given to the automation office, in order to be inserted into
the system.

A.   FACTORS OF SERVICE STATUS

1.   Graduation from Military Academies

The data required by the system, for each grad-
uate, will be provided by the corresponding academy by
completing the FIRST INSERTION report and sending it by mail
to the automation office. Also with the report must be
attached, for documentation and error checking purposes, the
order of the Air Force General Staff, for the nomination of
the cadets.

2.   Recalled Personnel in Active Duty

Here we have two cases :

a.   Recall in a Year Different from that of
Retirement

In this case, the data for each one recalled in
the active duty, will be submitted by the Directorate of
Personnel through the FIRST INSERTION report, since at the
end of the year of the retirement, the person's record was
deleted from the system.

b.   Recall Within the Year of Retirement

In this case, the information will be sent by
completing the MONTHLY CHANGE report, since the record of
this person is not deleted yet from the system (deletions of
records for retired personnel will be done once a year, at
the end of the year).   In both cases, the Unit in which the
person is assigned is responsible to give the related infor-
mation, since the payment must start from the day that the

recalled was appeared in the Unit in which he is assigned. Attached with the FIRST INSERTION or MONTHLY CHANGES report must be,for documentation and verification reasons,the order of recall and certification of the responsible Unit,about the date in which the person was appeared to resume duties.

3. Change of Names

This case refers to changes that occur for many reasons such as marriage,divorce etc. The information will be given by the Unit in which the person is assigned,by the MONTHLY CHANGES report,attached will be a copy of the administrative decision by which the name is changed.

4. Promotions

Here we see two cases :

a. Promotion to the Next Rank

It refers to the actual promotion to the next rank,the information about that,will be given by the Personnel Directorate through the MONTHLY CHANGES report,attaching to it the order of promotion.

b. Financial Promotion to the Next Rank

It refers to financial promotion to the salary of the next rank,after the person has a certain number of years in the current rank. In this case the person remains in the current rank but gets the salary of the next rank. This change will be given to the automation office by the Finance Directorate through the MONTHLY CHANGES report.

5. New Assignment

The information will be supplied by the Unit through the MONTHLY CHANGES report,attaching the order of the new assignment.

6. Retirement

In this case, the information will be given by the Unit in which the person is serving during the time of the retirement, by the MONTHLY CHANGES report. Attached supporting documents must be the order of retirement, and certification of the Unit about the exact date in which the retirement was executed.

7. Specialty

This information about the qualifications of the personnel and the changes of them that occur with time, will be given to the automation office by the Personnel Directorate through the MONTHLY CHANGES report, attached must be the order about the recognized new specialty.

8. Restricted Payment

This case applies when a military person is in jail for any reason, in this case, he does not get full payment for the days of imprisonment, but part of it. This information will be supplied by the Personnel Directorate through the MONTHLY CHANGES report, supporting the information with the order of imprisonment, which usually reports the period of time for which the person will be in jail, and the reduction that must be done to the person's salary.

9. Air Force Unique Number (AFUN)

This number is unique for each one serving in the Air Force, it is used in the metal identification cards and it is written on the ID cards. This number is assigned to each person when he first enters the service, and is released with his retirement. In some very limited cases this number may change. This information which is important to the automated system, because it is unique, and therefor can be

used as a primary key to distinguish the records of the people, will be given to the automation office by the Personnel Directorate, through the MONTHLY CHANGES report. It must be supported by the order which assigns the unique number to the person.

B.   FACTORS OF PERSONAL AND FAMILY STATUS

This case includes wife, parents unable to work who are supported financially by their son, and the related items with the above changes, such as marriage, birth, death, divorce, maturity of children etc. Information on them will be given by the Unit in which the person is assigned, through the 'MONTHLY CHANGES' report.

C.   FINANCIAL ACTIVITIES STATUS

This case includes loans that the person has received from financial organizations, like banks, credit unions or from the Air Force cashier. Also purchases on credit from the military exchanges. Information about such activities are given to the automation office by the Units, through the 'LOANS-DEDUCTIONS' report.

The above factors and their changes that occur in time, determine the exact amount of money that must be paid each month to the people, also the above information specify the Units in which the people are assigned, so the corresponding payroll checks can be produced by the system automatically by Unit, so that the distribution of them will be done safely and easely.

We note here, that the above enumeration of the factors may not be exhaustive, or new factors may be introduced in the future. In any such case, the list of factors can be extended, and the manipulation of the new factors will be analogous, as that of the ones already identified, which is described in the chapters that follow.

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III. U̱S̱E̱ O̱F̱ ṞE̱P̱O̱ṞṮS̱

As mentioned in chapter two,the necessary input data for
the process of the monthly payment are given to the automa-
tion office by means of three reports,which are :
1. First Insertion Report
2. Monthly Changes Report
3. Loans - Deductions Report
Following we give a layout of these reports,and the
necessary instructions about the way that they must be
filled,for double purpose,one is correctness,and second,to
facilitate the job at the automation office.

A. FIRST INSERTION REPORT

This report is used to insert a person into our auto-
mated payroll system;it is used only once for each person,to
give the first data needed to the system to start producing
the monthly payment of the particular person. The further
update of these data,with the changes that occur in time,is
performed by the other two reports,the Monthly Changes or
the Loans - Deductions reports.
In Figure 3.1 we propose a layout of the new insertion
report,and following we explain how it must be filled out by
the sources of this report.

1. I̱ṉs̱ṯṟu̱c̱ṯi̱o̱ṉs̱ f̱o̱ṟ F̱i̱ḻi̱ṉg̱ ṯẖe̱ F̱i̱ṟs̱ṯ I̱ṉs̱e̱ṟṯi̱o̱ṉ Ṟe̱p̱o̱ṟṯ

In the upper right corner we write,as it is indi-
cated,a number to keep a counting of the reports filed each
month;always we start with the number 1 and each month we
restart from 1 till the number of filed new insertion
reports,also we indicate the A.F.Unit which files the report

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NEW INSERTION REPORT

NO. . . . .

UNIT . . . .

DATE . . . .

D A T A E L E M E N T S	C O D E D D A T A	
A F U N	☐☐☐☐☐☐	1 --6
D A T E	☐☐☐☐☐☐	7 -12
CODE OF NEW INSERTION (stand)	0 1	13-14
CATEGORY	☐☐	15-16
RANK	☐☐	17-18
RECEIVED SALARY	☐☐	19-20
SPECIALTY	☐☐	21-22
LAST NAME	☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐	
FIRST NAME	☐☐	43-44
MIDDLE NAME	☐	45
WIFE	☐	46
CHILDREN	☐	47
CHILDRENS PLAN	☐	48
DEPENDENT PARENTS	☐	49
TIME PERCENTAGE	☐☐	50-51
YEAR COMPLETION DATE	☐☐☐☐☐☐	52-57
WAY OF INSERTION IN SERVICE . .	☐	58
TECH. OF OTHER ALLOWANCE	☐	59
MILITARY MAGAZINES	☐	60
MEB. OF COMMON SHARE FUND	☐	61
NOT PAID	☐	62
FAMILY SUPPORT	☐	63
NEW OFFICER	☐	64
AIR FORCE BASE	☐☐☐☐	65-68
MEB. OF MILITARY HOUSING	☐	69
ACC. NO. IN MIL. HOUSING	☐☐☐☐☐	70-74

Figure 3.1 First Insertion Report.

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and the date of completion. The left column, labeled 'data elements', is completed by the Unit which files the report, the right column labeled ' coded data ', is left empty and it is completed at the automation office by trained people, in order to use this appropriately coded information for input into the system.

a. Air Force Unique Number (AFUN)

The assigned A.F.Unique Number is written here, this number is taken from the order of nomination.

b. Date

The date of nomination is written here, this means that the payment of the person must start from this date. In the case of recall to active duty, the day of appearance to resume duties is reported here.

c. Category

The category in which the person belongs is written here. This category is found from the Table 1 below.

d. Rank

The rank of the person is written. The ranks of the Air Force personnel are shown in the Table 2 below.

e. Received Salary

Here is written the rank corresponding to salary received; e.g. if a captain has been financially promoted to major, we put here 'major', if a major has been financially promoted to Lt.Colonel we write 'Lt. Colonel', etc.

f. Specialty

Here we put the specialty of the person. The specialties of the military personnel are shown in the Table 3 below.

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```
┌─────────────────────────────────────────────────────────────┐
│                                                             │
│                       TABLE 1                               │
│               Categories Of Military Personnel              │
│                                                             │
│     Categories                           Coding             │
│     Commissioned Officers                  10               │
│     Non Commissioned Officers              20               │
│     Enlisted                               30               │
│     Recalled Comm. Officers                40               │
│     Recalled Non Comm. Officers            50               │
│     Recalled Enlisted                      60               │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

g.   Last Name

The last name is written here.

h.   First Name

The first name is written here.

i.   Middle Name

The father's name is written here.

j.   Wife

We write the word 'yes' for married people and 'no' for single, divorced, or widow.

k.   Children

We put here the number of dependent children (ages less than 18) e.g. three (3).

TABLE 2
Ranks Of Air Force Personnel

Rank	Coding
Chief of staff	01
Lieutenant general	02
Brigadier general	03
Colonel	04
Lt.Colonel	05
Major	06
Captain	07
First Lt.	08
Second Lt.	09
Warrant Officer	10
Non Tech Sgt.	11
Com Sgt.	12
Corporal	13
Airman	14

l.   Children's Plan

The number of children that are in the children's plan is written here.

m.   Dependent Parents

The number of dependent parents of both spouses is written here.

n.   Percentage Depending on Years in Service

We put here the percentage that is calculated and added to the salary and which depend on the total number

TABLE 3

Specialties Of The Air Force Personnel

Specialty	Coding
Pilots	01
Copilots	02
Engineers	04
Financial Officers	05
Supply Officers	06
Air Controlers	09
Air Field DEfence	10
Administrative Off.	13
Meteorologists	14
Photographers	15
Translators	16
Musicians	17
Doctors	19
Dentists	20
Pharmacists	21
Judges	23
Secretaries-Judges	24
Chaplains-ministers	25
Nurses	26
Ground duties pilots	27
Ground duties copilots	28

of years in service e.g. 52%. Table 4 shows the correspon-
dance between years in service and applicable percentage.

o. Date of Year Completion

Here we write the date in which the person completes a full year in service, this date will be used later to calculate automatically some allowances e.g. time allowance or financial promotion.

p. Way of Insertion into Service

The way of insertion into the service is written here e.g. Air Force Academy, University, etc.

q. Technical and Other Allowances

We write here the allowance, if any, for which the person is eligible and the corresponding percentage.

r. Military Magazines

We write here the military magazines to which the person is a subscriber e.g. Military review.

s. Member of Common Share Funds

Here we put 'yes' if the person is a member of the association.

t. Not Paid

We write 'not paid', if the person must not be paid for any reasons e.g. imprisonment.

u. Family Support

We write here the number of children that are eligible for family support allowance.

v. Air Force Base

We write here the financially independent Air Force Base to which the person belongs.

w. Membership in Military Housing Association

Here is written 'yes' if the person is member of this particular organization.

x. Account Number in Housing Association

We write here the account number that this person has in the military housing association,to send the monthly deductions there.

B. MONTHLY CHANGES REPORT

This report is used monthly by the responsible Units,as they were specified in Chapter 1,in order to report to the automation office the changes that occur to their personnel, and which affect the monthly payment. The monthly changes report is the main report that will be used by the Units to report the occurring monthly changes,affecting ne people assigned to them,to the automation office. It is advised here,that special attention must be paid in order for the elements to be correct,since the correctness of the payroll will be mainly based on the information provided through this report.

Also we suggest here,that the information must be given as soon as possible. By this,we mean that a change can be given in the month that it actually happened or one or two months later,but in the second case,it will create overhead to the system,since we must calculate backtracking payments and make appropriate adjustments.

In Figure 3.2 we propose a layout of the Monthly Changes report,and following we explain how it must be filled out by the sources of this report.

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HELLENIC AIR FORCE
AUTOMATION OFFICE

MONTHLY CHANGES REPORT

List of Monthly Changes from......to.....

PAGE....FROM.....
UNIT.............
DATE.............
ATTACHED.........

DESCRIPTIVE ELEMENTS OF CHANGE

TR.	RANK	N A M E	DESCRIPTION OF CHANGE	AFUN	DATE	CODED DATA

CODED DATA

| 1 | 6 | 7 | 12 | 13 | 14 | 15 | 16 | 17 | 32 |

AFUN | DATE | CODE | C H A N G E

Figure 3.2   Monthly Changes Report.

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1. <u>Instructions for Filing the Monthly Changes Report</u>

In the upper right corner,we write the page number if more pages are used, the Unit which files the report,the date of mailing and the number of attached documents. The left half part,under the title 'Descriptive elements of change',is completed by the Unit which sent the report;the right half part,under the title 'Coded Data',is left empty and it is filled out at the automation office by qualified people for further processing. Following we explain,by examples, the way of filing the report by its sources.

a. Change of Last - First Name

This change is given by the Directorate of Personnel as follow :

<u>RANK</u>	<u>NAME</u>	<u>DESCRIPTION OF CHANGE</u>	<u>AFUN</u>
Major	Papadopoulos H.	Change of last name from Papadopoulos to Pappas	7224
Major	Papadopoulos H.	Change of first name from Harilaos to Harris	7224

b. Family Status

(1) <u>Wife</u>. This change is given in the cases of marriage,death or divorce and the report is filled as follow:

<u>RANK</u>	<u>NAME</u>	<u>DESCRIPTION OF CHANGE</u>	<u>AFUN</u>
Captain	Adams R.	Married 23 Feb. 1985	3445
Captain	Adams R.	Divorced 25 Aug.1986	3445

(2) <u>Children</u>. The change is given in the cases of increase or decrease of the number of children from birth,death or maturity. The report is filled as follow :

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RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Major	Tilly G.	Total number of children 4 from February 15,1985	3335

(3) **Dependent Parents.** The change is given in the case when we have increase or decrease in the number of dependent parents of both spouses,according to existing laws. The purpose of this information is to calculate the correct amount of state tax that must withheld from the monthly payment e.g. :

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Fst Lt.	Jones A.	Number of dependent parents 2 from September 1,1986	6636
Fst Lt.	Smith H.	Number of dependent parents 1 from December 1,1989	8899

c. Air Force Unique Number (AFUN)

The AFUN may be up to six digits,and it is given mainly by the Directorate of Personnel or from the Units,in cases of errors that may arise from copying,coding,punching etc,e.g :

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Colonel	Johnson A.	AFUN 7305 new AFUN	7306

In the case where there are more changes for that person in the same month,they must be given with the old AFUN and from the next month they must be given with the new AFUN.

d. Category

This change is given from the Directorate of Personnel whenever the person changes category. The categories of the personnel are given in the table 1 e.g:

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Sgt.	Marcus I.	Change category from noncommissioned to commissioned officer from 20 Jan.85	6664

e. Specialty

        The change is given from the Directorate of
Personnel or from the Units in case of error in the
specialty for a particular person.   The specialties of the
personnel are shown in Table 3,e.g. :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Corporal Demos R.   Change specialty to supply   3464
                    from 10 March 1986

        f. Promotions

        Here,as we mention in Chapter 2,we have two
cases as follow :

        (1) Promotion to the Next Rank.   The change is
given by the Directorate of Personnel as follow :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Captain Smith J.   Promotion to major from 5 Mar.85   3845
        (2) Financial Promotion to the Next Rank.   In
this case,the change is given to the automation office by
the Directorate of Finance as follow :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN

Lt.Col. Harris A.   Financial promotion to Colonel   1045
                     from November 15,1985

        g. New Assignment

        In this case the change is given from the new
Unit,because this means that   the person has appeared
there,so the salary must be sent to the new Unit e.g. :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Major   Reeke D.   New assignment from 138 A.F.Base   8815

h. Retirement

This change must be given from the Unit in which
the person is serving, because only this Unit knows the
exact date in which the retirement was actually done,also
similar change is given in the case of death e.g.:

RANK	NAME	DESCRIPTION CF CHANGE	AFUN
Colonel	Mark T.	Retirement from 11 April 1986	8945
Lt.Gen.	Agnew S.	Death on 15 March 1987	9999

i. Recall in Active Duty

As we mention in chapter 2,if the recall takes
place in the same year as the retirement,the change will be
given through the monthly changes report,since the record of
this particular person is not yet deleted from the system
(Deletions of records for people exiting the system during
the year, will be done once a year at the end of the
year),e.g. :

RANK	NAME	DESCRIPTION CF CHANGE	AFUN
Colonel	Chok M.	Recalled in active duty from 1Nov86	5240

j. Restricted Payment

This change will be given to the automation
office by the Directorate of Personnel in cases where,for
reasons provided by laws,a particular person must receive
restricted payment,or no payment at all,for a certain period
of time e.g.:

RANK	NAME	DESCRIPTION CF CHANGE	AFUN
Sgt.	Timos L.	Not paid for 15 days from	6561
		1 june 86 - imprisonment	
Sgt.	Larry A.	Reduced payment by 30% for	3322
		two months from 15 July 86	
		-- punishment	

k. Percentage Depending on Years in Service

This percentage is applied to the basic amount of salary and it is added,as we will explain in later chapters,to form the monthly salary. The applicable percentage for each one depends on the total number of years in service and is shown in Table 4. Our intention is that this percentage may be determined and applied automatically by the system,since in our record we keep the information 'Date of one year completion' (see Chapter 2.A.1.o). Until then the Units must give the following information derived from Table 4 below :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Colonel Johnson A. Time allowance 60% from 1 Feb. 85   8395

l. Technical Allowance

This allowance,which is given to some people according to their experience, performed job,and qualifications,is actually a percentage which is calculated on their basic salary,and it is added to form the monthly payment. The change is given to the automation office by the Directorate of Personnel as follows:

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Tech.Sgt Walsh S. Eligible for tech. allowance 30%   6312
                   from 24 April 1985
Tech.Sgt Rocky L. Suspension of tech. allowance   2337
                   from 10 March 1986

m. Danger Jobs or Unhealthy Conditions Allowance

This allowance is given to some people for performing extremely dangerous jobs (pilots,copilots,ammunition loading etc.) or working under

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┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│                          TABLE 4                                  │
│              Percentage Depending on Years in Service             │
│                                                                   │
```

Years in service	Commissioned Officers	Noncommissioned Officers
2	4%	4%
4	--	12%
5	12%	--
6	--	20%
8	20%	28%
10	--	36%
11	28%	--
12	--	44%
13	36%	--
14	--	52%
15	44%	--
17	52%	60%
20	60%	64%
23	68%	68%
26	72%	72%
29	76%	76%

unhealthy conditions (chemicals,colors,fuels etc.).   This
allowance is given for the period of dangerous or unhealthy
job and it is suspended after that,   according to existing
detailed regulations on the subject.   The related change is
given by the Units in which the above jobs are executed as
follow :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Captain   Petros L. Allowance for dangerous job   6539
                     30% from 12 July 1985

Captain   Aris B.   Suspension of unhealthly job   6583
                     allowance from 1 July   1786

        n.   Travel Duty Allowance

        All military people are eligible for a standard
monthly amount to cover expenses for TDY up to four days.
This is calculated automatically by the system for every
one. But there are some cases where,according to regula-
tions,it must be suspended for people in hospitals,prisons,
punishments etc. In this case the following change is
provided :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Major   Rahe G.   Suspension of TDY from 1 July 86   3575
Major   Rahe G.   Eligible for TDY from 5 Aug. 86   3575

C.   LOANS - DEDUCTIONS REPORT

    This report is used monthly (or whenever the case
arises),by the Units to report loans that their people have
received by financial organizations (banks,credit unions
etc.) or from the cashier of the Unit.

    This information is needed in order to determine the
proper amount of money to be deducted,on a monthly base,from
their payment and to sent the money to their creditors until
the corresponding loan is fully repaid.

    In Figure 3.3 we propose a convenient layout of such a
report and following we give a short explanation of the way
it must be filed,since it is obvious from the headings of
the columns the meaning of the required information.

HELLENIC AIR FORCE
AUTOMATION OFFICE

LOANS - DEDUCTION REPORT

PAGE.... FROM....
UNIT........:....:
DATE........:....:
ATTACHED........:

TRAN NO.	TITLE OF FINANCIAL ORG.	RANK	N A M E	AFUN	DATE	CODES	MONTHLY AMOUNT	TOTAL LOAN	ACCOUNT NUMBER
				1	6 7	12 13 14 15 16 17	21 22	27 28	33

Figure 3.3 Loans -- Deductions Report.

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1. <u>Instructions for Filing the Loans Deductions Report</u>

In the upper right corner we write,as it is indi-
cated,the page number if more pages are used,the Unit which
files the report,the date and the number of supporting docu-
ments if any.

a. Title of the Financial Organization

Here the title of the organization which gives
the loan is written e.g. Bank of Greece,Athens Credit Union
etc.

b. Rank,Name,AFUN,Date

The rank,the name,the Air Force Unique Number
and the date is written here. The AFUN is written as it is
explained in chapter 4.B.a, the date is written according to
the instructions given in Chapter 4.B.2,below.

<u>RANK</u>	<u>NAME</u>	<u>AFUN</u>	<u>DATE</u>
Major	Papadopoulos H. 007224		850330

c. Codes

This space is left empty in order to be filled
in by the automation office.

d. Monthly Amount

Here we write the amount of money which we must
deduct monthly in order to repay the loan,this money will be
send to the financial organization or to the Unit,if it is a
kind of prepaid amount for an emergency. We write the
monthly amount from right to left,any remaining places to
the left will remain empty.

e.   Total Amount of Loan

Here   the   total   amount due   to   the   financial
organization   which gave   the lcan is written.   If the loan
was given by   the Unit,to facilitate a   person,and agreed to
be   repaid   from   the   salary of   the   next   month,then   the
'Monthly amount'   column and   the 'Total   loan' column   must
agree.   We write the total amount   of the loan from right to
left,any more spaces to the left remain empty.

f.   Account Number

Here the account   number for the service   of the
particular loan is written. We write the account number from
left to   right,any more   spaces to   the right   remain empty.
Again if it is   a loan from the Unit to   facilitate an emer-
gency this column is left blank.

All the   above information   can be   derived from
the documents that   the person,   who contracted   a loan,will
provide   to   the Unit's cashier,in   order   to   arrange   the
regular repayment of his loan.

The system automatically will   deduct the appro-
priate   monthly   amount of   money   for   the service   of   any
loan,from the monthly salary of   any person involved in such
activities.   Also the necessary reports with the data of the
person will   be produced   and the   deducted amount   of money
with   the report   will be   send to   the indicated financial
organization.   The system also will keep information for the
remaider of   the loan,and will   stop making   deductions when
the loan is fully repaid.

IV. CODING OF INFORMATION

A. GENERAL

Coding of information, in our context, means the represen-
tation of incoming data into the automation office by
numbers, letters, symbols or combinations of the above, for the
purpose of facilitating the processing of data by the under-
lying computer system. The data necessary to the payroll
system are information about the personal and family
status, the service status and about loans or deductions, for
each one served by the automated payroll system.

The above described necessary information, arrive to the
automation office by means of three reports, they are :
   a.   First Insertion Report
   b.   Monthly Changes Report
   c.   Loans - Deductions Report

These reports were designed in a way to facilitate the
sources which originate them and the process in the automa-
tion office. In Chapter 3 we give possible designs of these
reports and instructions concerning their use.

The reports were designed in a way which allows concur-
rent use of them by the sources and by the automation office
for coding. By 'concurrent' here, we mean that the same
report (same paper), is partially filled in the Units and the
remainder is completed in the automation office, so they have
horizontal and vertical lines which form squares.   In each
square, when we are coding the corresponding information, we
may write a digit, a letter or a symbol, according to the
given instructions.   The information (data) that must be
coded, for subsequent processing, are shown in Appendix A
together with their assigned code number, and the sources

that send the corresponding information to the automation office.

Each change is characterized by a code number, which is formed from two up to four digits. The first two digits of this number depend on the part of record that they refer to; by this we imply that the record of each person in the system, is conceptually divided into three parts which are :

1. That part of the record which contains the data of a person that usually seldom change, and if so, they do not make it necessary to calculate backtracking payment e.g. Name, AFUN, etc. For reference only we will call this part of record 'invariant' and the code number for changes addressed to the invariant part of record is 05.

2. That part of the record which contains data arising from the financial activities of each person. This means loans from banks or other financial organizations, purchases on credit from military exchanges etc. This part of the record may be empty, if the person has no such transactions, and in any case, the changes here do not make necessary to calculate backtracking payment. For reference, we will call this part of record 'loans' part and the characteristic code number for this part is 08.

3. The last part of the record, is what we will call 'variant' part, which contains all the data which if changed, make it necessary to calculate backtracking payment and make adjustments. This part is characterized by any two digit number from 11 to 99, these numbers characterize also the kind of change; so the code number for changes refered to the variant part of record is a two digit number only.

The second two digit number (3rd and 4th digits) specifies the kind of change which we have within the invariant

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or loans part of the record. So, for example, a code number 0501 means that we have a change in the 'invariant' part of the record, since the code 05 refers to that part, and within this part a change in the AFUN, since code 01 means a change in the Air Force Unique Number (AFUN), as we can derive from Table 12 in Appendix B. A code number 0802, as we can see in Table 13 in Appendix B, means that we have an information which refers to the 'loans' part of record, since code number 08 implies that, and more specifically, we have a loan from the Air Force cashier, since code number 02 implies 'Air force loans'. Finally a code number 11, as we also may see in table 14, reports a change in the 'variant' part of record, since the code number is not 05 or 08, and in particular a 'promotion to next rank'.

In Appendix B, we have tables which show the data grouped by the above described division of the record (invariant, loans, variant), and also the code numbers for each kind of change.

Following we give instructions for coding the information arriving at the automation office, by means of the above mentioned three reports.

B. CODING OF THE NEW INSERTION REPORT

The left half part of the New Insertion report, under the title 'Data Elements', is filed by the Units, the remaining right half part, under the title 'Coded Data', is completed by the people at the automation office, as it is explained below.

1. Coding of Air Force Unique Number, (squares 1-6)

In the first six squares of the report, we write the AFUN starting writing from right to left, we put zeroes in any remaining squares if the number has less than six digits e.g. for AFUN 3453 we must write 003453.

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2. Coding of Date, (squares 7-12)

We write the date from left to right, we put first the year (the last two digits of the year), next we write the number for the month, and lastly the day of the month. If the month or the day of the month have one digit then we put a zero in front of them e.g. The date April 9, 1984 will be coded as 840409, the date December 19, 1985 will become 851219.

3. New Insertion Coding, (squares 13-14)

We put the characteristic number of the new insertion which is 01, this number informs the system that we have a new person in the system, so the system must create a new record for the newcomer, and start producing the monthly payment, based on the data provided by the New Insertion report.

4. Coding of Category, (squares 15-16)

We write the code number corresponding to the category of the particular person. We find this number from Table 1, where we show the categories of the personnel and code numbers for each category.

5. Rank Coding, (squares 17-18)

We write here the code number corresponding to the rank of the person. The coding of ranks is shown in Table 2.

6. Received Salary Coding, (squares 19-20)

We put here the code number corresponding to the rank of which the salary is the person receiving. We can find the code numbers from Table 2 e.g. for a captain who has been financially promoted to major, we write in squares 19-20 the

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code number for the rank of major,which as we see in the Table 2 is 06.

7. Specialty Coding,(squares 21-22)

We write here the number corresponding to the specialty of the person, according to table 3,where we see code numbers and specialties.

8. Coding of Last Name,(squares 23-42)

We write the last name in the provided squares from left to right.

9. First Name Coding,(squares 43-44)

We put here from left to right the two first letters of the first name.

10. Middle Name Coding,(square 45)

We put in square 45 the first letter of the father's name.

11. Wife Coding,(square 46)

In square 46 we put 1 if the person is married otherwise we put zero.

12. Children Coding,(square 47)

We write in square 47 the number of children of the particular person.

13. Children's Plan Coding,(square 48)

We write in square 48 the number of children that participate in the children's plan for the future.

14. Dependent Parents Coding, (square 49)

Here we write the number of dependent parents of both spouses.

15. Received Percentage Coding, (squares 50-51)

We write here the received percentage which is depending on the total number of years in service. Table 4 shows years in service and eligible percentage for commissioned and noncommissioned people.

16. Coding of Year Completion Date, (squares 52-57)

Here we write the date in which the person completes a full year in service, we write the date from left to right. We put first the two last digits of the year, next we write the month and last the day of the month e.g. for the date March 5,1985 we write 850305.

17. Coding of Way of Insertion into Service, (sq.58)

Here we write 1 if the person is graduated from any Air Force academy, otherwise we put zero.

18. Coding of Allowances, (square 59)

Here we put the code number which corresponds to the allowance for which the person is qualified. We can find this number from Table 5, where we show the allowances and their characteristic number.

19. Coding of Military Magazines, (square 60)

We put here 1 if the person is a subscriber to a military magazine, otherwise we write zero.

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┌─────────────────────────────────────────────────────────────┐
│                                                             │
│                        TABLE 5                              │
│              Technical and Other Allowances                 │
│                                                             │
│        NAME OF ALLOWANCE                CODE NUMBER          │
│        Suspension of allowance              0               │
│        Technical            25%             1               │
│        Technical            30%             2               │
│        Technical            35%             3               │
│        Cashier's allowance   %              4               │
│        Danger jobs allowance %              5               │
│        Unhealthy Cond. all.  %              6               │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

20. Coding of Membership in Common Share Funds, (sq. 61)

    We write in square 61 a 1, if the person is a member of military common share funds or a zero, if he is not a member.

21. Coding of not Payed Case, (square 62)

    Here we put 1 if the person must not be payed, otherwise we put zero.

22. Coding of Family Support, (square 63)

    We write here the number of children for which the person receives family support allowance.

23. New Officer Coding, (square 64)

    We put here 1 if we have a newcomer in service, otherwise we put zero (recall in active duty).

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24. Coding of Air Force Units,(squares 65-68)

Here we write the code number corresponding to the
unit in which the person is assigned. In Table 6 we show a
coding of the Air Force units,from this table we can derive
the appropriate code number for each unit.

TABLE 6
Air Force Units

NAME OF UNIT	CODE NUMBER
Hellenic Air Force General Staff	0100
Air Training Command	0200
Air Supply Command	0300
Air Defence Command	0400
North Air Force Wing	0410
East Air Force Wing	0430
South Air Force Wing	0420
WEst Air Force Wing	0440
138 Air Force Base	0412
140 Air Force Base	0421
160 Air Force Base	0425
200 Air Force Base	0445
Krete Air Force Base	0426
5th Radar Unit	0405
12 Radar Unit	0406
Air Fuel Unit	0310
First Reconstruction Unit	0320
Air Force Academy	0210
Air Force Hospital	0900

25. Coding of Military Housing Assoc.(sq.69)

Here we put 1 if the person is a member or a zero,if
he is not a member.

26. Coding of Account No.(sq.70-74)

We write in squares 70-74,the account number of the
person in the military housing association,from left to
right.

C.   CODING OF THE MONTHLY CHANGES REPORT

The collection of all 'Monthly Changes Reports' arriving
at the automation office every month,from every Unit or
responsible directorates,provide the changes that occured to
the Air Force personnel,which affect the payment that is
going to be produced.

The reported changes,as they appear in the left half
part of this report,under the title 'Descriptive Elements Of
Change',must be coded in the automation office on the right
half part of this report,under the title 'Coded Data',in
order to make them processable and meaningful to our
computer system.

As we mentioned earlier in this chapter,the changes
reported by this report can be divided into two groups. In
one group belong the changes that refer to the 'invariant'
part of record; (they do not need backtracking calcula-
tions),in the other group,we include the changes refered to
elements of the 'variant' part of the record,by this
implying, that we must calculate backtracking payments and
make adjustments.

1.   Coding of Invariant Elements of Record

The changes that affect the 'invariant' elements of
the record,have the characteristic code number 05 and they

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are shown in Table 12. The coding of the above group of changes is done as follow:

a. Under the column 'Date', squares 7-12, we write the 30th of the month in which the coding is done, even if the changes are refered to previous months. The date is written as it was explained in Chapter 4.B.2.

b. In columns 13-14, under the column 'Code Of Change', we write the code number 05, which informs the system that we have a change in an element not producing backtracking payment.

c. In columns 15-16, we write the characteristic number of the particular change, as we can derive it from Table 12, these code numbers range from 01 to 74.

d. Under the column 'Change', squares 17-32, we write the content of the change e.g. the new AFUN or the new name etc.

2. Coding of Variant Elements of Record

The changes that affect the 'variant' part of the record, are characterized by one two digit number only. They are shown in Table 14 together with their charactererizing number. The coding of this group of changes is done as follow:

a. Under the column 'Date', squares 7-12, we write the actual date from which this particular change is effective, since from that date we must make calculations for backtracking payment and make adjustments. Again this date is written as instructed in Chapter 4.B.2.

b. Under the column 'Code Of Change', squares 13-14, we put the characteristic number of each particular kind of change. We can find the above number for each change in Table 14, they range from 11 to 99 e.g. for a change that reports a retirement we write in squares 13-14 the code number 99.

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c. Under the column 'Change', squares 15-32, we write the content of the change e.g. the new rank or the eligible allowance etc.

General Note : The column 'Air Force Unique Number', squares 1-6, is completed by the Units and it is checked in the automation office for correctness and completeness. The AFUN is written as it was explained in Chapter 4.B.1.

3. Some Interesting Examples of Coding

Following we give some examples, showing the way in which we are coding the changes arriving in the automation office, for both the 'invariant' and the 'variant' kind of changes.

a. Coding of AFUN Change

The Unit has reported the following change with the report of August 1985, see Chapter 3.B.1.c.

RANK   NAME   DESCRIPTION OF CHANGE   AFUN
Colonel Johnson A. AFUN 7305 new AFUN   7306

We are coding this change as:

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15-16)   (17-.....................32)
850830   05   01   0C7305

The coding was based on Chapter 4.C.1.

b. Coding of New Assignment Change

A particular unit, say 160 Air Force Base, has reported the following change with the report of March 1985, see Chapter 3.B.1.g :

RANK   NAME   DESCRIPTION OF CHANGE   AFUN
Major   Reeke D. New assignment from 138 A.F.B   8815

We are coding this change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15-16) (17.......................32)
850330   05   04   0425

This coding was based on Chapter 4.C.1.

       c. Coding of Name Change

      A unit with the report of March 1985 reported
the follow, see Chapter 3.B.1.a :

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Major	Papadopoulos H.	Change of last name from	7224
		Papadopoulos to Pappas	

We are coding the above change as follow :

DATE   C O D E   C H A N G E
(7-12)   (13-14)   (15-16) (17....................32)
850330   05   13   PAPPAS

The coding is based on Chapter 4.C.1.

       d. Coding of Category Change

      The unit in February 1985 reported the follow
change,see Chapter 3.B.1.d.

RANK	NAME	DESCRIPTION CF CHANGE	AFUN
Sgt.	Markus I.	Change category from noncommissioned	6664
		to commissioned off.from Jan.20,1985	

We are coding the above change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15-16) (17.......................32)
850228   05   14   10

NOTE: 0514 says that we have a change in category,see Table 12, 10 is the code number for the new category (commissioned officer),see Table 1.

The coding is based on Chapter 4.C.1.

        e.   Coding of Specialty Change

        A unit reported in September 1985 the following change, see Chapter 3.B.1.e :

RANK   NAME   DESCRIPTION OF CHANGE   AFUN
Corporal Demos R.   Change specialty to supply   3460

We are coding the above change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15-16)   (17......................32)
850930   05   15   06

NOTE :   0515 implies that   we have   a change   in specialty,Table 12, 06 is the code number for the new specialty (that of supply), as we can see in Table 3.

The coding is based on Chapter 4.C.1.

        f.   Coding of Wife Change

        A particular Unit reported in September 1986 the following changes,see Chapter 3.B.1.b.(1) :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Captain   Adams R.   Married February 23,1985   3445
Captain   Adams R.   Divorced August 25,1986   3445

We are coding the above changers as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15-16)   (17......................32)
860930   05   23   1
860930   05   23   0

NOTE : 0523 means to the system a change in wife status, Table 12, 1 means marriage, 0 means not married, divorced or death of wife, according to Chapter 4.B.11.

Again the coding is based on Chapter 4.C.1.

   g. Coding of Children Change

   The Unit, in March 1985 reported the following change, see Chapter 3.B.1.b.(2).

RANK	<u>NAME</u>	<u>DESCRIPTION OF CHANGE</u>	AFUN
Major	Tilly G.	Total number of children 4	3335
		from February 15,1985	

We are coding the above change as follow :

<u>D A T E</u>	<u>C O D E</u>	<u>C H A N G E</u>	
(7-12)	(13-14)	(15-16)	(17.......................32)
850330	05	24	4

NOTE: 0524 is the code number for a change in childrens, see Table 12, number 4 in column 17 is the contents of the change, that is, the number of the children. This coding is also based on Chapter 4.C.1.

   h. Dependents Coding

   A Unit in October 1986 reported the following change on dependents, see Chapter 3.B.1.b.(3).

RANK	<u>NAME</u>	<u>DESCRIPTION OF CHANGE</u>	AFUN
Fst. Lt.	Jones A.	Number of dependents 2	6636
		from September 1,1986	

We are coding the above change as follow :

<u>D A T E</u>	<u>C O D E</u>	<u>C H A N G E</u>	
(7-12)	(13-14)	(15-16)	(17..................32)
861030	05	25	2

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NOTE : 0525 means to the system a change in dependent parents status, Table 12,2 is the content of change (the new number of dependents).

The coding is based on Chapter 4.C.1.

   i. Military Housing Association Coding

      A Unit has reported in March 1985 the follow change :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Captain   Tilden B. Member of Military Housing   2535
                      Association account no. 36518

We are coding the above change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15-16) (17......................32)
850530   05   72   136518

NOTE : 0572 implies a change of membership in Military Housing Association, Table 12,a 1 in column 17 implies membership (new member),see Chapter 4.B.25,the number 36518 is the account number for the new member.

This coding is according to Chapter 4.C.1.

   j. Promotion Coding

      The Unit reported with the report of May 1985 the follow change, see Chapter 3.B.1.f.(1).

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Captain   Smith J.   Promotion to major from March 5,85 3845

We are coding this change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15................................32)
850305   11   06

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NOTE : 850305 is the effective date of promotion,code number 11 reports a promotion (see Table 14),06 is the code number for the new rank (major) from Table 2.

The above coding is an example of a change refered to the variant part of the record,it is based on Chapter 4.C.2.

k. Financial Promotion Coding

A Unit reports on December 1985 the follow change,see Chapter 3.B.1.f.(1).

RANK	NAME	DESCRIPTION CF CHANGE	AFUN
Lt.Col.	Harris A.	Financial promotion to Cclonel from November 15,1985	1453

We are coding the above change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15.............................32)
851115   12   04

NOTE : 851115 is the effective date of financial promotion,code number 12 reports a financial promotion (see Table 14),04 is the coding of the new rank (Colonel) from Table 2. This change is refered to the variant part of the record,the above coding is according to Chapter 4.C.2.

l. Technical Allowance Coding

The Unit has reported the following changes,see Chapter 3.B.1.l.

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Tech.Sgt.	Walsh S.	Eligible for tech. allowance 30% from April 1985	6312
Tech.Sgt.	Rocky L.	Suspension cf tech. allowance from March 10,1986	2337

We are coding the above changes as follow :

<u>D A T E</u>   <u>C O D E</u>   <u>C H A N G E</u>
(7-12)   (13-14)   (15................................32)
850424   23   2
860310   23   0

<u>NOTE</u> :   850424 and 860310 are the effective dates for the
above reported changes,code number 23 reports to the system
a change in technical allowance (see Table 14),code numbers
2 and 0,report correspondingly an eligibility for a 30%
technical allowance and a suspension of an allowance (see
Table 5). The above changes are refered to the variant part
of the record,their coding is based on Chapter 4.C.2.

   m. Coding of not Paid Case

   A Unit has reported the following change :

RANK   NAME   DESCRIPTION CF CHANGE   AFUN
Captain Totos N. Not payed frcm June 15,1985   2312

We are coding this change as follow :

D A T E   C O D E   C H A N G E
(7-12)   (13-14)   (15................................32)
850615   51   1

<u>NOTE</u> :   850615 is the effective date of this change,code
number 51 reports a restricted payment (see Table 14),a 1 in
column 15 is the coding for the case not paid at all (see
Chapter 4.B.21). This change is refered to the variant part
of the record and it is based on Chapter 4.C.2.

   n. Coding of Time Percentage

   A Unit has reported the following change,see
Chapter 3.B.1.k.

<u>RANK</u>   <u>NAME</u>   <u>DESCRIPTION OF CHANGE</u>   <u>AFUN</u>
Colonel Jchnson A. Time allowance 60% from Feb.1,1985 8395

We are coding the above change as follow :

```
D A T E      C O D E      C H A N G E
(7-12)      (13-14)     (15.................................32)
850201       13           60
```
NOTE : 850201 is the effective date,code number 12 reports a change in the time percentage,60 is the new percentage.

        o. Recall in Active Duty

        A Unit has reported the following change,see Chapter 3.B.1.i.

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Colonel	Chok M.	Recalled in active duty from November 1,1986	5240

We are coding this change as follow :

```
D A T E      C O D E      C H A N G E
(7-12)      (13-14)     (15.................................32)
861101       98
```

NOTE : 861101 is the effective day of the change,code number 98 informs the system that we have a recall in active duty within the year of retirement (Table 14). If it was not a recall within the year of retirement,it must have been reported by the New Insertion report, to create a new record for the recalled person. The above change is also refered to the variant part of the record and it is based on Chapter 4.C.2.

        p. Retirement Coding

        The Unit has reported the follow change,see Chapter 3.B.1.h.

RANK	NAME	DESCRIPTION OF CHANGE	AFUN
Colonel	Mark T.	Retirement from April 11,1986	8945

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We are coding this change as follow :

```
D A T E     C O D E     C H A N G E
(7-12)      (13-14)      (15........................32)
860411        99
```

NOTE :   860411 is the effective date of retirement, code
number 99 is a warning to the system that we have a case of
retirement (Table 14).   This change is also refered to the
variant part of the record and it is based on Chapter 4.C.2.

D.   CODING OF LOANS-DEDUCTIONS REPORT

The   'Loans-Deductions'   report, Figure3.3, is   mainly
completed by the Units, according to the instructions given
in Chapter 3.C.1. It can be used almost directly for input
to the system, since it is designed to serve this purpose.

Before we use it, we must check its correctness; with
what is reported in Chapter 3.C.1, and fill the only empty
column, that   under the title   'codes', squares   13-14 and
15-16, which are completed as follow :

1. Code of Change, (squares 13-14)

Here we write always   the characteristic number
08, which informs the system that we have a change in the
loans-part of the record.   More details on this see in
Chapter 4.A.2.

2. Code of Organization, (squares 15-16)

In columns 15-16, we write the code number identifying
the particular financial organization which granted the loan
to the person.   We can find the code numbers for the auto-
mated financial organizations in Table 13.   For example for
a loan from the National bank, we write in columns 13-14 :
08, in columns 15-16 : 18.

V. THE OUTPUT OF THE SYSTEM

The automated payroll system, must produce every month the required reports by the existing laws and regulations on the subject. The purpose of the output is; to facilitate the distribution of payment to the Units where the people are assigned; to make the audit control of the monthly payment by the Air Force office of the auditors, more efficient and easy; to help the Directorate of Finance to keep statistics and control the related expenses through the budget office.

The system also must generate reports for the financial organizations from which the people has received loans, with full information about the monthly deductions, which serve all the loans. Of course the produced output will appear different from the corresponding manual but actually will include the same elements in a more convenient way which will make it more understandable and usable wherever it is needed. The main output of the system will include the following :

A. LIST OF PAYMENT

This list will be provided in two copies by the system, it will be produced by Unit and it will be used in the Units, by the cashiers, to pay every month the people assigned to the Units. The original copy bearing the signatures of the payed people, will be submitted to the auditor's office, the second copy will be kept filed in the cashier's office, to replace the current manual elements which are filed there or to be used there for whatever it is required.

HELLENIC AIR FORCE   PAGE...........

AUTOMATIC OFFICE   UNIT...........

LIST OF PAYMENT

OF..................

FOR MONTH..............

	RECEIV. SALARY TIME PERCENT	AFUN	SPECIAL TY	RANK	N A M E			W	CH	PL	DE	TOTAL DEDUCTIONS	NET PAYMENT	SIGNATURE
h1														
h2	BASIC SALARY	AMOUNT OF PER	TECHN ALLOW	DANGER ALLOWAN	UNHEALTH J.ALLOW	TDY	FAMILY SUPPORT	SUM	STATE TAX	COMMON SHARE F.	MILITA HOUSIN	LOAN LOAN	AIR FORCE CASHIER	
L1														
L2														
L3														
L4														
					T O T A L S									

Figure 5.1 List Of Payment.

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This monthly list of payment will be separate for commissioned and noncommissioned officers, since the expenses for the corresponding payments, are charged to different articles of the budget. The form of this particular output may be as that of Figure 5.1.

The list of payment will have in each page at the top, two lines for the headers of the columns, these headers can be typed permanently from the manufacturing company, which will supply the required forms for the system. For each person the list of payment provides four lines for the items of his monthly payment.

The first line of the header (h1), corresponds to the items included in line one (11), the second line of header (h2), describes the items of lines two and three (12,13).

Line one (11), will hold data about the family and service status of each person, line two (12), will be used to hold the items of the current payment, line three (13) will be used to hold the backtracking payment, if such payment exists, otherwise it will remain empty. The fourth line, which is a line without separators (blank line), is used to print the justifications for the changes that are implemented in the current payment, as we will explain later on.

The last two lines in each page, will be used to hold the total amounts corresponding to the items described in the two lines of the header. So the first line of the total, will have the total amounts of deductions made and the total amount of the net payment. The second line of total will hold the total amounts for the items described in header line two (h2).

Each page will include the totals of the previous pages, so the last page of the list of payment of every Unit, will include all the totals, by item, that make up the payment of the personnel of each Unit. These totals can be used for whatever it is required, as for reimbursement of

cashiers,for statistics or for crossreference,because the sum minus the amount of total deductions must equals to the total of net payment.

Let us see more closely this 'list of payment'; at the top is printed 'LIST OF PAYMENT.........',here the system will print accordingly 'COMMISSIONED or NONCOMMISSIONED OFFICERS',next it will print the number of each page,starting from 1 for each Unit,after the word "FOR MONTH ....',it will print the current month of payment and next to 'UNIT............',will print the name of the Unit to which this payment is refered.

In the first line (l1),which corresponds to the titles of header line one (h1),we print in the first provided box the rank which the salary is the person receiving; e.g. if a captain has been financially promoted to major,we print here 'major',if he has not been financially promoted and he is paid as a captain,we print here 'captain'. In the second provided box of this line,we print the eligible percentage which is depended on the total number of years in service e.g. a commissioned officer serving for 20 years,is eligible for 60% time allowance(table 4),so here we print 60%.

In the next consecutive boxes,under the titles AFUN,specialty,rank, name,we print the actual data for the particular person,next under the title 'W',we print 1 if the person is married,otherwise we leave it empty, under 'CH' we print the total number of children,under 'PL' we print the number of children that participate in the children's plan,under 'DE' we print the number of dependent parents for both spouses. Under the title 'Total Deductions',we print the total amount of money that is deducted from the payment of the current month for any reason,under 'Net Payment',we print the net amount of money that the Unit's cashier must pay to the person,finally under 'Signature' each person must put his signature,when he is paid by the cashier of the Unit.

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In the second line (l2),which corresponds to the titles of header line two (h2),we print consecutively starting from the left,the amount of basic monthly salary for the rank which the salary is the person receiving,the amount of time percentage,derived by applying the percentage on the basic salary,the amount of the technical allowance (if any,otherwise the space remain empty),the amount of danger jobs allowance (if any),the amount of the unhealthly jobs allowance (if any), the amount for the standard TDY,the amount for family support (if any), after that we print the sum of all the previous amounts. Next we start printing the deductions,first we print the state tax for that month,the monthly amount for participating in common share funds,the monthly amount for the military housing association (if member),the monthly amounts for servicing of every loan separately (if any),finally we print the received loan from the Unit's cashier (if any).

The sum of all these deductions,is printed in line one under the title 'Total Deductions'. As we explained previously,the difference between the sum and total deductions is the amount of net payment that is printed in line one,under the title 'Net Payment', just before the signature,to facilitate the cashier for the payment and to prevent possible mistakes or confusion.

The line three (l3),which is exactly the same as the line two,is used to hold the amounts whenever we are forced to calculate backtracking payment,as we have explained erlier in Chapter 4.A.3 and in Appendix B. If we have no backtracking payment,for the particular person,this line remains empty.

In the fourth line (l4),which is a blank line,we print the justifications for the changes that have been done in the payment of the person (if any),or to the personal or family data of the person, compared with the payment and data of the previous month.

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TABLE 7

Printing Of Changes In The List Of Payment

CHANGE	WE PRINT IN LINE FOUR
Restricted payment	Reason-Date-Order no.
Time percentage	New percent.-Date-Order no.
Promotion to next rank	New rank-Date-Order no.
Financial promotion	New rank-Date-Order no.
Tech. allowance	Percentage-Date-Order no.
Danger-unhealthy all.	Percentage-Date-Order no.
TDY	Eligib.-susp.-Date-Order no.
Children's plan	Children no.-Date-Order no.
Recall in active duty	Date-Order no.
New insertion	New insertion-Date-Order
AFUN	AFUN(New) from(Date)
New assignment	(Date) from (old Unit)
Name	Order no.
Category	New category-Order no.
Specialty	New specialty-Order no.
Wife	Married(Date)-Othercases(Date)
Children	Number of child.-Date
Dependent	Number of parents-Date
Loans	Financ. organ.-Monthly amount
Retirement	Date-Order no.

These justifications will facilitate mainly the control at the auditor's office,where this list of payment will be sent every month for audit control,as it is required by the existing regulations. In this line we can print up to four changes for every person,they are printed as it is shown in

Table 7 Basically we print the reason of the change, the effective date of the change and the order (ID.No.of the order). So for a promotion to the next rank, we print in fourth line, according to Table 7, the new rank, the effective date of promotion and the order number, for that particular promotion.

B.   ENVELOPE OF PAYMENT

This particular output, will be manufactured as an envelope, open on the right side, to hold in the money that each person must receive from the Unit's cashier. The envelope of payment will be produced, by the system, using the above special form by Unit, so the Unit's cashier can put in the money to all the envelopes, make his financial balance, for possible errors, and when everything seems correct, he can start paying the personnel.

An easy way for the cashier to avoid mistakes on counting of money will be to separate the needed amount of money for the payment of the current month, he knows this amount from the totals of the 'List Of Payment' (see Chapter 5.A), after that, he can start putting the money in the envelopes of payment, when he finishes that, he must have zero money left out of the envelopes and no one empty envelope.

The 'Envelope Of Payment' can be designed as it is shown in Figure 5.2.   On the envelope of payment are printed the following data fore every person in the system, in the provided for this purpose spaces.

Please check your data and inform the cashier in cases of errors

HELLENIC AIR FORCE
AUTOMATION OFFICE

ENVELOPE OF PAYMENT

| AFUN | RANK | SPEC. | NAME | TIME PE. | W | CH | PL | DE | UNIT.... |
| MONTH.... |

ENTITLEMENTS

NAME OF ENTITLEM.	CURRENT MONTH	BACK TRACK PAYMENT
Basic Salary		
Time Allowance		
Technical Allowance		
Danger Job Allowance		
Unhealthy Job Allow.		
Family Support		
TDY		

DEDUCTIONS

NAME OF DEDUCTION	CURRENT MONTH	BACK TR PAYMEN.
State Tax		
Common Share Funds		
Military Housing		
Military Magazines		
Loan		
Loan		
Unit's Cashier		

TOTAL ENTITL.
TOTAL DEDUCT.
NET PAYMENT

TOTALS

Figure 5.2   Envelope Of Payment.

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1. In the first line,are printed the service and family status data of the person,on which the monthly payment is based,they are the same data as they are mentioned in the 'List Cf Payment'. So we print,in the provided spaces,the AFUN,the rank,the specialty,the last name,the first name,the time percentage,the wife (by a 1 if married),the number of children,the number of children participating in the children's plan, the number of dependent parents,the Unit's name and finally the current month of payment.

2. Next the eligible amounts and deductions are analyzed in vertical columns. The eligible amounts appear in two columns,the first column is for the current month amounts,the second column is for the amounts of the backtracking payment (if any). The deductions also appear in two columns,the first column holds the deductions from the payment of the current month and the second cclumn hold the deductions made on the backtracking payment amounts.

3. The last line,holds the totals of each one of the above columns.

4. On the right side of the envelope,there are provided three boxes,one is to print in the total of the eligible amounts,the seccnd box is to hold the total amount of deductions and the last one,is to prirt in the net amount of payment,this equals the difference of the previous two totals.

This particular design of the 'Envelope Of Payment',will facilitate first,the Unit's cashier to be well prepared for the payment of the personnel,since he can put in each envelope the exact amount which is written on the 'Net Payment ' box and make his financial balance in advance to prevent errors and secondly,the people who receive this envelope,after they have put their signature on the 'List Of

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Payment',with all the information affecting their monthly payment printed on the envelope of payment.

With the 'Envelope Of Payment',we hope that the people will check and compare every month their payment with the payment of the previous month,so they will provide an excellent feedback to our system for possible errors and flows. We can prompt the people doing that,by printing in the offset of the envelope a message for that,saying 'please check your data and inform the cashier in case of errors or differences'.

C. STATISTICAL REPORT

This report,is required by the Directorate of Finance for the budget office,in order to keep control and statistics of the expenses for the payment of the personnel. This report is also used by the Air Force Central Treasurer,to allocate the money correctly among the Units.

The report is produced by category of personnel (commissioned, noncommissioned),since the related expenses are charged to different articles of the budget. A possible form of this report could be the following :

<u>STATISTICAL REPORT</u>
PAYMENT OF COMMISSIONED OFFICERS
MONTH..................

1. Hellenic Air Force General Staff   DR...............
2. 138 Air Force Base   DR...............
3. 140 Air Force Base   DR...............
4. 160 Air Force Base   DR...............
5. Krete Air Force Ease   DR...............
....
....
       TOTAL AMOUNT FOR THE AIR FORCE   DR...............

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The system,after it has finished the production of the payment for a particular month,for all the Air Force personnel,is able to print the above 'Statistical Report'. Another similar report will be produced for noncommissioned officers. The system already has the above amounts from the process of producing the 'List Of Payment',where for each Unit we produce separate list of payments for commissioned and noncommissioned people and we keep the totals for each Unit,see Chapter 5.A.

D. LISTS OF DEDUCTIONS

These lists of deductions,are produced by organization,one list for every financial or other organization,which is waiting some monthly amount of money from the Air Force people for different,each one of them,reasons. So for example,the Bank of Greece is waiting the monthly payments for the loans granted to the Air Force people,the 'Military Housing Association' is waiting the money from its members,the Air Force Exchange is waiting the monthly amount of money from sales on credit etc.

An appropriate design for these 'Detailed Lists of Deductions' could be that of Figure 5.3.

Let us see more closely the list of deductions,on the upper right hand corner we print the page number,next we print the month of the current payment and the name of the financial organization or institution,to which the deductions belong.

On the main body of the list,we print a counting of the persons on the left column,in the next columns we print horizontally the AFUN,the rank, the name ,the deducted amount and the account number of the particular person in this organization.

```
---------------------------------------------------------------
| HELLENIC AIR FORCE                                          |
| AUTOMATION OFFICE                              PAGE....      |
|                                                             |
|                  LIST OF DEDUCTION                          |
|             From payment of month...............           |
|             For................................            |
|                                                             |
---------------------------------------------------------------
| NO.| AFUN | RANK | NAME              | AMOUNT  | ACC.NUMBER  |
|----|------|------|-------------------|---------|-------------|
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|    |      |      |                   |         |             |
|///////////////////| T O T A L       |         |/////////////|
---------------------------------------------------------------
```

Figure 5.3   List Of Deduction.

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When the first page is full with names, we will print
the sum of all the individual amounts in the last line, in
the provided space for the total, and we will continue
printing on the second page. At the end of the second page
we will add the sum of the second page to the total of the
first page and the new sum will be printed on the second
page, in the provided space for the total. Continuing in this
way, at the end, we will have the sum of all the amounts
included in the list, printed in the provided space for the
total of the last page.

These lists of deductions, will be produced by the system
after the monthly production of the payment, from the data
that already exist in the files of the system. After
that, these lists will be forwarded to the Air Force
Accounting Office, to be used there for the payment of all
the different financial or other organizations expecting
legally money from the Air Force.

For example, the Accounting Office will send to the Bank
of Greece, the total amount of money printed on the list of
deduction for the Bank of Greece, also it will send a copy of
the list to the Bank of Greece, to report the analysis of the
money and facilitate the Bank to keep its own files
updated, with the monthly repayments of the loans to the Air
Force people. The same procedure will be repeated for every
organization expecting legally money from the Air Force
personnel.

E.   ANNUAL INCOME CERTIFICATE

The annual income certificate, is produced at the end of
the fiscal year, we print one certificate for each person.
It reports all the amounts that each person received from
the Air Force through the automated system or by manual
payments during the fiscal year. The form of the annual
income certificate could be as it is shown in Figure 5.4.

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HELLENIC AIR FORCE
AUTOMATION OFFICE

C E R T I F I C A T E
Of annual income for fiscal year.........:
Payed to.................................:

| KIND OF INCOME | ANNUAL SUM OF ENTITL-EMENTS | D E D U C T I O N S | | | | | TOTAL DEDUC-TIONS | NET ANNUAL SALARY |
		COMMON FUNDS	SHARE	MILITARY HOUSING	LOANS	STATE TAX		
SALARY BY AUTO-MATION								
MANUAL PAYMENTS								
TOTALS								

AIR FORCE ACCOUNTING OFFICE
(signature)

Figure 5.4   Annual Income Certificate.

The annual income certificate,besides the annual total entitlements, includes the deductions made from the annual salary,by category. This certificate is used by the citizens,to submit their annual income report to the Internal Revenue Service,with any other income from other sources. This will allow the responsible department of the state,to calculate the exact amount of the annual tax,according to existing laws of taxation.

The income certificate,as we see in Figure 5.4,provides spaces in the first line of the main body,to print the annual sum of the entitlements, the annual deductions by case,the sum of all the annual deductions and the amount of the net annual payment,which is the difference between total annual entitlements and total annual deductions.

After the production,the certificates will be forwarded to the Air Force Accounting Office,where the second line marked 'Manual Payments', will be completed with the annual manual payments to the people (if any), also they will write the deductions made on the manual payments,and they will compute the totals in every column. The certificates after all the above,will be signed,by the responsible person at the accounting office and they will be mailed to the Air Force personnel.

The above mentioned output,is the main product of the system,it implements efficiently the monthly payment of the personnel and makes explicit all information pertaining to every one's monthly payment. It also facilitate the audit control of the monthly payment,and is valuable to the Accounting Office for keeping statistics and controling the budget. Any additional reports,if necessary,can be easely produced by appropriate production programs,which will exploit the existing data in the files of the system.

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VI. FINANCIAL ANALYSIS OF ENTITLEMENTS AND DEDUCTIONS

In this chapter, we will try a quick analysis of the entitlements and deductions, applicable to the military and will try to calculate manually the monthly payment of an imaginary person. So doing, we will get a flavor of the task that the payroll system is going to perform each month, for every person in the system. This also will help us to understand better the records and the files, which will be described in later chapters.

A. ANALYSIS OF ENTITLEMENTS

The entitlements for the military, are established by orders from the Directorate of Finance, they change with time in their number and in the amount of money of each one, the main entitlements for commissioned and noncommissioned officers are the following :

1. Basic Salary

This entitlement, is an amount of money which corresponds to the ranks of the hierarchy, as they appear in Table 2. The basic salaries change with time, with new orders from the Directorate of Finance. They usually follow the GNP, the inflation rate, the cost of living and the objectives of Department of Defense.

In our system, we can store the table of basic salaries and when we have a change to basic salaries, we must update the stored table. Such a stored table could be the one of Table 8 bellow.

Actually the rank will not be stored, as it appears in the table above, instead will store only the code numbers

```
+--------------------------------------------------------------+
|                                                              |
|                         TABLE 8                              |
|                   Table Of Basic Salaries                    |
|                                                              |
|                            Code Of          Basic            |
|    Rank                    Rank             Salary           |
|    Chief Of Staff          01               40000            |
|    Lieutenant General      02               38000            |
|    Brigadier General       03               37000            |
|    Colonel                 04               36000            |
|    lt. Colonel             05               35500            |
|    Major                   06               34000            |
|    Captain                 07               33000            |
|    First Lt.               08               32500            |
|    Second Lt.              09               32000            |
|    Warrant Officer         10               31800            |
|    Non Tech. Sgt.          11               30000            |
|    Com. Sgt.               12               29000            |
|    Corporal                13               26000            |
|                                                              |
+--------------------------------------------------------------+
```

for the ranks,however we show the ranks in the table of basic salaries only for reference and readability of the table.

So when a record reports a 04,in the field provided for the rank,our program must search the table of basic salaries,to find the code number 04 and get the amount corresponding to rank 04,which in our case is 36000 drachmas. This is the basic salary,for the particular colonel processed by our system,this amount will be used for subsequent processes as it is required,also it will be printed in the output of the system e.g. in the 'List Of Payment' and in the 'Envelope of Payment',in the provided space for the basic salary, see Figures 5.1 and 5.2.

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2. Time Percentage

This entitlement depends on the total number of
years in service,in Table 4 we show the correspondence
between years in service and time percentage,for commis-
sioned and noncommissioned people. The entitled percentage
is applied on the basic salary of the person,and the result
is the amount of this entitlement.

As an example,let the colonel of the previous
case,to serve for 20 years,so from Table 4 we find that he
is entitled for 60% time percentage. Applying this to the
basic salary for the rank of colonel, we get 36000 x 60% =
21600,this is the amount for this entitlement. This amount
will be used for subsequent process and it will be printed
wherever it is required e.g. in the 'List of Payment' and in
the 'Envelope of Payment',in the provided space for the time
allowance,see Figures 5.1 and 5.2.

Our system is able to find the entitled time
percentage,for each person in the system automatically,since
we have the information 'Date of Year Completion' and
'Category',see 'First Insertion Report (Figure 3.1). So our
production program,can subtract the 'Date of Year
Completion' from the date of the current month,to find the
total number of years in service,next can search the table
4,under the persons category,and get the entitled
percentage. Of course we imply that the Table 4 will be
loaded in memory during the run of the payroll system or can
be stored in our library of utilities.

3. Technical Allowances

This entitlement is for people working at technical
jobs and who are responsible for the operation or mainte-
nance of sophisticated equipment e.g. aircraft engi-
neers,electrical and mechanical engineers etc. The technical

allowance is a percentage from 25%,30% or 35%,it is estab-
lished individually by orders from the Directorate of
Personnel, also it is suspended by later orders according to
existing regulations on the subject.

The amount of the entitlement is found by applying
the entitled percentage on the basic salary of the first
lieutenant for commissioned officers,and on the basic salary
of warrant officer for noncommissioned people.

Let for example,the colonel of the previous case,to
be entitled for 30% technical allowance,by order from the
Directorate of Personnel. The amount for this entitlement is
32500 x 30% = 9750 (basic salary of first lieutenant times
the percentage). This amount will be printed wherever it is
required e.g. in the 'List of Payment' and in the 'Envelope
of Payment',in the provided space for 'Technical Allowance',
see Figures 5.1 and 5.2.

Our automated system is capable of calculating this
entitlement for each person in the system,since it has the
information about it from the 'First Insertion Report',see
Figure 3.1 and Chapter 4.B.18,after that, the system is
continuously informed for changes in technical allowances,
by the 'Monthly Changes Report',see Chapter 3.B.1.1.

The production program,after reading from the
person's record the characteristic number in the provided
field for technical allowances, say a 2,can search the Table
5,which will be stored in memory, to find the corresponding
percentage, in our example 30%. Next it must apply it to the
basic salary of first lieutenant,if the person is a commis-
sioned officer,or on the basic salary of warrant officer,if
he is a noncommissioned officer,to find the amount of money
for this entitlement.

4. Danger Jobs Allowances

This entitlement is for people performing extremely dangerous jobs,like pilots,copilots,flying engeneers,ammunition loading people etc. The danger jobs allowance is a percentage from 20% up to 80%,it is established individually by orders from the Directorate of Personnel, it is also suspended by later orders according to existing regulations on the subject,which determine the performed jobs and the entitled percentage for the danger jobs allowance.

The amount of the entitlement is found by applying the entitled percentage on the basic salary of captain for all the entitled personnel (commissioned,noncommissioned).

Let for example,the colonel mentioned earlier,to be entitled for 20% danger jobs allowance,by order from the Directorate of Personnel. The amount for this entitlement is 33000 x 20% = 6600 (basic salary of captain times the percentage). This amount will be printed wherever it is required e.g. in the 'List of Payment' and in the 'Envelope of Payment',in the provided space for 'Danger Jobs Allowance',see Figures 5.1 and 5.2.

Our automated system,is able to calculate this entitlement for each person in the system,since it has the information about it from the 'First Insertion Report',see Figure 3.1 and Chapter 4.B.18,after that, the system is continuously informed for occuring changes in danger jobs allowances by the 'Monthly Changes Report',see Chapter 3.B.1.m.

The production program,after reading from the person's record the characteristic number in the provided field for 'Technical or Other Allowances',say a 5,can search the Table 5,which will be stored in memory,to find the corresponding percentage. Next it must apply it to the basic

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salary of captain, to find the amount of money for this entitlement.

5. Unhealthly Jobs Allowances

This case is similar to the previous one,it is treated the same as that of danger jobs allowance,only the entitled percentages may differ, the entitled percentage is also applied on the basic salary of captain. Our automated payroll system,is able to calculate it automatically in the same way as the danger jobs allowance and for the same reasons.

Just for an example,let the colonel of our case,to be entitled for 10% for Unhealthly Jobs Allowance,by order from the Directorate of Personnel. The amount for this entitlement is 33000 x 10% = 3300 (basic salary of captain times the percentage). This amount is printed wherever it is required e.g. in the 'List of Payment' and in the 'Envelope of Payment',in the provided space for 'Unhealthly Jobs Allowance',see Figures 5.1 and 5.2.

6. Family Support Allowance

This entitlement is for married people,to help for family expenses and raise of children. The entitled percentage depends on the family status, and it is applyed on the basic salary of warrant officer to find the amount of money for family support allowance.

The entitled percentage is determined as follow :
a. For married people,the family support allowance is 10% on the basic salary of warrant officer.
b. For each child,we add to the above percentage 5% up to five children,for each child after five we add 7%.

The allowance is entitled for children up to eighteen years old or up to twenty three years old if they are students,or forever for children disabled for manual or

intellectual work because of illness or accidents. In the case where the parents are separated (divorced),they do not get the 10% (case a above) and the family support allowance is entitled to the parent responsible to raise the children.

For example,let our colcnel above,to be married with two children under eighteen years old. He is entitled for a percentage of 20% for family support (10% for married plus 10%for the two children). The amount for this entitlement is 31800 x 20% = 6360 (basic salary of warrant officer times the percentage). This amount will be printed wherever it is required e.g. in the 'List of Payment' and in the 'Envelope of Payment', in the provided space for 'Family Support Allowance',see Figures 5.1 and 5.2.

Our automated system is capable to calculate this entitlement for each one in the system,since it keeps the needed information for doing this. In the beginning from the 'First Insertion Report',see Figure 3.1,it is informed if the person is married and the number of children (if any). After that the system is continuously informed about changes in the family status by the 'Monthly Changes Report',see Chapter 3.B.1.b.

Our production program,after reading the information from the person's record about family status (wife,number of children),it can determine the entitled percentage,according to the above given description. Next it must apply it to the basic salary of warrant officer,to find the amount of money for this entitlement.

7. TDY

All military people are entitled for a standard monthly amount of money, to cover expenses for TDY,up to four days. The amount of money for this entitlement is found by adding the amounts of basic salary and time percentage,for the particular person,dividing the sum by

thirty (days of month) and multiplying the result by four (max standard days of TDY per month).

Let,for example,calculate the TDY allowance for the colonel of the previous cases. We have already found basic salary for him 36000,see Chapter 6.A.1,time percentage amount 21600,see Chapter 6.A.2,the sum of the two is 57600,we divide it by thirty and we get 1920,we multiply it by four and get 7680,this is the amount for this entitlement. This amount will be used for subsequent processing and will be printed wherever it is required in the output e.g. in the 'List of Payment' and in the 'Envelope of Payment',in the provided space for 'TDY',see Figures 5.1 and 5.2.

Our production program,can compute the entitled amount for TDY,since it has already found the basic salary and the amount of time percentage, see Chapter 6.A.1 and 6.A.2. It has to add them,next divide the sum by thirty and multiply the result by four,to find the amount of money for this entitlement.

B. ANALYSIS OF DEDUCTIONS

The deductions on the monthly payment of the personnel,are established by laws of the state and regulations by the Department of Defense. Some of them are established by the payee himself,like deductions for loans he has contracted and membership payments to the associations he is a member. The list of deductions changes from person to person and from time to time,the main deductions,we often encounter,are the following :

1. State Tax

This is the main and most important deduction made on the monthly payment. This deduction is established by law of the state and it is an obligation of all the citizens of the state.

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The amount monthly deducted,depends from the family status of the person,like wife,number of children,number of dependent parents and from the height of his monthly payment. To find the monthly amount that must be deducted,for state tax,we must follow each month the following main steps :

a. We multiply the monthly sum of entitlements by four-teen to find the annual income of the person. We multiply by fourteen,because we have fourteen payments in a fiscal year,the extra two are; one payment bonus for new year,half payment for vacation allowance in July and half payment bonus for Easter celebration.

b. From the annual sum of the entitlements,we must deduct some amounts that are tax deductibles e.g. amount 20000 for personal expenses,20000 for wife's personal expenses,for each child 15000 for the first two, 25000 for the third and 35000 for each one after the third and 15000 for each dependent parent. If some member of the family is disable we subtract 100000 annually.

c. The remaining amount is the amount that must be used to calculate the annual and monthly tax. We calculate the annual tax using the Table 9,where we see annual income and corresponding state tax. For example,if someone has annual taxable income 850000 drachmas,he must pay according to Table 9 the following : For annual income 832000 corresponds annual tax 202960,for the remaining 18000 the tax coefficient is 42%,we multiply by it and we get 7560,so the annual tax for annual taxable income 850000 is 210520.

d. From the annual amount of tax found above,we must subtract the following amounts; 4800 for the wife,6500 for the first child, 8000 for the second

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child,9500 for the third child,20000 for each child after three and 2000 for each dependent parent.

e. The remaining amount is the actual annual tax,we divide it by fourteen to find the monthly amount for this deduction. This amount will be printed wherever it is required e.g. in the 'List of Payment' and in the 'Envelope of Payment',in the provided space for 'State Tax', see Figures 5.1 and 5.2.

TABLE 9
Table Of Annual State Tax

Income Section	Tax Coefficient	Tax Of Section	Total Income	Total Tax
80000	--	--	80000	--
53000	11	5830	133000	5830
53000	14	7420	186000	13250
53000	17	9010	239000	22260
53000	20	10600	292000	32860
90000	23	20700	382000	53560
90000	26	23400	472000	76960
90000	30	27000	562000	103960
90000	34	30600	652000	134560
180000	38	68400	832000	202960
180000	42	75600	1012000	278560
360000	46	165600	1372000	444160
360000	50	180000	1732000	624160
1800000	54	972000	3532000	1596160
1800000	58	1044000	5332000	2640160
Any more	60			

Our production program will include a module to calculate the annual and monthly tax. The module will use the existing information in the person's record about family status (wife,children,dependent parents), see Figure 3.1,and the total monthly amount of entitlements as they where calculated in Chapter 6.A. Furthermore the system is continuously informed for changes in family status,which affect the monthly amount of tax,by the 'Monthly Changes Report',see Chapter 3.B.1.b. With all the above input the module will determine the monthly amount of state tax that must be deducted from each person's monthly payment.

Of course,the amount of state tax can not be very accurate,but at the end of the fiscal year all payees will receive their annual 'Income Certificate',see Figure 5.4,and they will submit their annual income report to the Internal Revenue Service. This department will make the final accurate adjustment of the annual state tax, because all parameters affecting the state tax will be actual at the end of the year.

2. Common Share Funds

This deduction is made on a monthly basis,to provide funds for the 'Common Share Fund Organization',which supports,mainly financially,the military during active duty time and especially during retirement, according to the regulation of the organization.

This deduction is 3% monthly,and it is applied on the sum of the basic salary and amount of time percentage. As an example,let calculate the deduction for the colonel we use in all previous cases,his sum of basic salary and amount of time percentage is 57600,see Chapter 6.A.1 & 2,so we have 57600 x 3% = 1728. This amount will be printed wherever it is required e.g. in the 'List of Payment' and in the 'Envelope of Payment', in the provided space for 'Common Share Fund',see Figures 5.1 and 5.2.

Our automated system,is capable to calculate this
deduction directly for each person,since it has the informa-
tion for the entitled basic salary and the entitled time
percentage,see Chapter 6.A.1 & 2.

3. Military Housing Association

This organization collects money from its members
every month and try to provide houses to its members,after
some years of membership,under very economical condi-
tions,compared to the open market.

The amount of money that must be deducted monthly is
directly determined by the organization,and it corresponds
to the ranks of the hierarchy e.g. for colonel may be
1000,for captain 550 etc,the amount for ,membership is
revised from time to time by later decision of the organiza-
tion's administration.

Our automated system,can determine directly the
amount of the deduction, since it is informed if someone is
a member of the association,see Figure 3.1, and continuously
it is informed for new members by the 'Monthly Changes
Report',see Chapter 4.C.3.i. So it can deduct the amount
corresponding to the rank of the member each month,for the
military housing association.

4. Loans

This deduction is made for the repayment of loans
and other on credit purchases of the military personnel. The
system is able to deduct automatically the proper amounts of
money for the above reasons,since it is continuously
informed by the 'Loans-Deductions' report,about the finan-
cial activities of the persons in the system,see Chapter
3.C.

The system will continue to deduct every month the
monthly amount for repayment of the financial obligation and

will stop automatically making deductions, when the total amount of the loan has been repayed, this is why the 'Loans-Deduction' report includes the amount of monthly payment and the total amount of the loan.

C. MANUAL CALCULATION OF PAYMENT

Let now calculate manually the monthly payment of the colonel used in all our previous discussion. First we must find the basic salary, from the discussion in Chapter 6.A.1, we found 36000 for basic salary. The amount for time percentage is 21600, see Chapter 6.A.2. He receives technical allowance 30%, which is 9750 dr, see Chapter 6.A.3, he is also entitled for 20% for danger jobs allowance, which is 6600 dr. according to Chapter 6.A.4. he also receives a 10% for unhealthly jobs allowance, which is 3300 dr, see Chapter 6.A.5. Because of his particular family status he receives 6360 dr. for family support allowance, as Chapter 6.A. 6, and his standard TDY allowance is 7680, see Chapter 6.A.7. Adding all the above entitlements we found total monthly amount of entitlements 91290 drachmas.

Next we must calculate the deductions, if we follow the procedure described in Chapter 6.B.1, we find monthly state tax 23689 drachmas. For the common share fund organiza- tion, we must deduct 1728 dr, according to chapter 6.B.2. Following we assume that he is not member of the military housing association and he has not received any loan. So his monthly sum of deductions is 25417 dr. and the net payment is the difference between total of entitlements minus total of deductions, that is 65873 drachmas.

The above manual calculation of a monthly payment is the softest case we can encounter, since we do not have back- tracking payment and changes that make the calculations complicated and error prone.

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The discussion in this chapter, gives us a flavor of the task that the automated payroll system is called to perform each month. This task is required to be correct, under the assumption that the information provided through the reports, mentioned in previous chapters, will be correct and the translation of them into coded input data will also be done correctly, according to the given instructions in Chapter 4.

In addition to the above task, the automated system must keep history files for each person in the system, since it is necessary for a lot of reasons to have information for all previous months. So when we encounter a change for a person, we do not just update the record of the person, because doing this we lose information, but we must in someway, to create a new record for the person, which will contain the new information in the appropriate field and it must be chained to the previous record of the person.

In the above described way, the system in order to keep the history of the persons alive, must create for each one of them a chain of records. The length of the chain, will vary from person to person and it will depend from the number of changes to the data of the person during the past time.

The chain of records for a person during a year, will be the historical file of the person for one year. Of course we must decide which changes will create new records, because some of them are not important to keep, and the creation of chained records will cause overhead to our system and may subject to limitations caused by the underline machine.

We must also decide for the length of time for which we will keep history files (usually one year), at the end of the period probably we must keep a hard copy of the historical files and erase all the records of the chain except the last, which will be the top of the chain for the next period.

VII. FLOW OF INFORMATION

A. GENERAL FLOW

From the discussion of the previous chapters,it is clear that we have already established a flow of information from the Units and other sources of information (concerning the monthly payment of the personnel),to the automation office. There through subsequent processing,we transform the arriving information into coded data and finally by running the set of programs consisting the payroll system,we produce the monthly payment of the personnel.

The monthly payment,consists from the output described in Chapter 5,that is,the 'List of Payment' for each Unit,provided by category of personnel,the 'Envelope of Payment' produced by Unit,the 'List of Deductions' provided by financial organization,the 'Statistical Report' for the budget office and at the end of the year, we provide the 'Income Certificate' for the adjustment of state tax by the Internal Revenue Service.

The produced monthly output,must be forwarded to the appropriate users in time,to be used for the intented purpose. So we have another flow of information (in the form of hard copy),from the automation office to the Users of the system output. We may represent pictorially this monthly flow,with the diagram of Figure 7.1.

B. FLOW TO THE AUTOMATION OFFICE

The diagram shows first,the flow of information from the sources of its creation to the automation office. What is actually flowing from the designated sources is; The 'Monthly Changes Report',one such report from every source
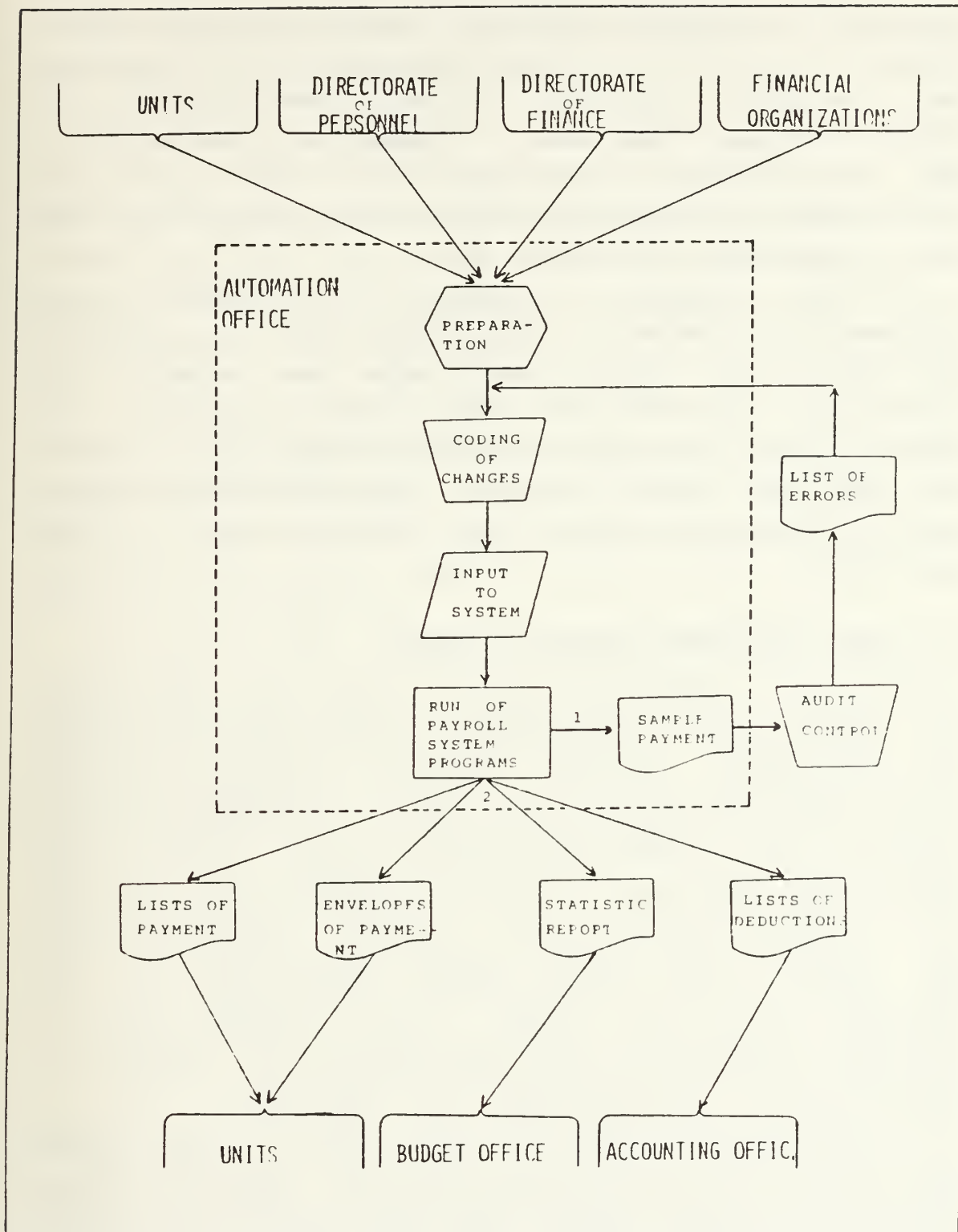
Figure 7.1   Monthly Flow of Information.

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containing all the monthly changes that occured to the
personnel assigned to them,more details on this see in
Chapter 3; The 'First Insertion Report',one such report for
each new person introduced to the system and lastly the
'Loans Deduction Report,from the financial organizations or
the Units,containing information about loans to the Air
Force people. The above reports and the way they are used
is fully described in Chapter 3.

In the automation office,as it is shown in the
diagram,after a kind of preparation,which may include a
checking to see if all the Units have submitted the
reports,we are coding the information contained in the
reports,according to the instructions given in Chapter 4.
The above coded form of changes is ready to be used as input
to the system,to produce the monthly payment of the
personnel.

C. ERROR PREVENTION -SAMPLE PAYMENT

Before we produce the monthly payment for all the Air
Force personnel, we consider it wiser to produce first a
'sample payment'. That is, instead of producing the whole
output,consisting the monthly payment, we produce a limited
payment to give us the opportunity to check it and prevent
errors before we spend a lot of resources. The correctness
of the sample payment,as it is explained below,will verify
the quality of the whole monthly payment,which is very
important since the payment of the personnel must be
performed the same day every month and without errors in the
calculations of the entitlements and deductions.

The philosophy behind this is as follow : By axiom of
computer science,we accept as correct the monthly payment of
every person in the system,if he has no one change in his
family and service status. This means,that the payment of

the current month will be identical with the payment of the previous month,if one has no changes affecting his payment. So under the above axiom,chances of errors exist for people with changes in their data.

In order to prevent errors and avoid difficult correcting actions,when errors will be discovered later,we produce a sample payment (consisting only from the 'List of Payment',not the whole output),including only people with changes affecting their payment. By this we mean,that if someone has a change in the AFUN for example,we will not include him in the sample payment,because this change does not affect the amount of money he must receive the current month. We will produce the sample payment for people with changes that affect the amount of money that they must receive. Such changes are mairly the ones refered to the 'Variant' part of the record and some others as they are described in Appendix B.

The above sample payment will be send to the Auditor's Office,where they will check the correctness of the produced payment,for people with changes in the current month. The Auditors can check the sample payment directly from the provided information in the 'List Of Payment',since as we have designed it,see Chapter 5.A,it reports the justification of the implemented changes in the fourth line. Also they can use,for the audit control of payment,their own sources of information to identify the errors occured. After the audit control,they will return the sample payment with their remarks and findings,if any,to the automation office.

Based on the remarks of the Auditors,we will make the necessary perfections to our programs or to the input data,if any errors where due to them. Next we will run the system to produce the whole monthly payment,as it has been described in earlier chapters. In this way we hope that we will eliminate the errors,by discovering them before they get out of system's control and reach the people.

This procedure will also benefit the work at the automation office, because it is known that errors discovered after the payment, must be corrected the following months, sometimes they need special procedures which usually are time consuming and error prone.

D. FLOW FROM THE AUTOMATION OFFICE

After we have produced the monthly payment, the output will be forwarded to the users, that is; The 'List Of Payment' and the 'Envelope Of Payment' will be send to the Units, to be used for the payment of the personnel; The 'Statistical Report' will be send to the Budget Office and the 'Lists Of Deductions' to the Accounting Office.

The above described flow of information will be repeated each month. But in order to assure the smooth production of the monthly payment on time, so that the personnel will be payed the 30th day of each month, we must establish a timing diagram (deadlines), for the different phases of the payroll system.

E. CHRONODIAGRAM

By law of the state, the military personnel is prepayed, that is, the 30th day of each month we must pay for the next month. It is obvious so, that the payment of the next month can not be based on the changes of the next month, because they are not known yet. Also it can not be based on the changes of the current month, because the current month the automation office is going to work to provide the payment of the next month, furthermore the production of the monthly payment for all the Air Force personnel, is not an instant job, it needs a lot of time for preparation, coding of data, sample payment and the necessary communication between the factors of the payroll system.

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Under the above conditions,the only possibility is to produce the payment of the next month,based on the changes occured the month before the current,that is ,we produce the payment of October during September, based on the changes of August. We will use the month September to prepare and produce the payment of October,so that the 30th of September all Units will be ready to pay the personnel for month October.

In that case,we must establish the deadlines for the phases of the payroll system,probably by order of headquarters. Such a time diagram could be the following : All Units and other sources of data affecting the payroll system,must send by the 2nd of each month the reports containing the changes of the previous month,so the automation office will collect all the reports around the 10th of the month. The automation office will provide the sample payment by the 18th of the month and the same day they will give it to the Auditor's Office,for audit control. The auditors will return it checked by the 21st of the month. The automation office will produce next the whole payment by the 25th and it will forward the output directly to the specified users.

The above chronodiagram is a reasonable one,we suppose that every one involved in the production phases of the payroll system,is well aware of the importance of keeping them tight,because otherwise we will fail to meet the target day,which is the 30th of each month.

The limited available time for each phase of the system,implies that the people involved must be well prepared to perform their necessary actions immediatly,especially the Auditors must check the sample payment quickly,because the people at the automation office are waiting the audit report of the sample payment,to continue with the next phase of the payroll system.

The above noted bidirectional flow of informa-
tion, between the automation office and Units, performed
within the time constraints mentioned erlier, will provide a
smooth operation of the payroll system. That is, the auto-
mation office will have available in time, the necessary data
to produce the monthly payment of the personnel, and the
Units will have in time the means to pay their people. Also
the other users (accounting office, budget office), will
receive in time the output with the required data for their
own use.

F.   UNDETECTED ERRORS

Even we have the 'Sample Payment' checked by the finan-
cial auditors, before we provide the monthly payment, it is
still possible for a lot of reasons, to have some errors, that
will pass undetected and reach the people. Such errors is
possible to be discovered at any level, maybe by the payees
themselves, the Units' cashiers or most probably by the audi-
tors, when they will perform the normal audit control on the
whole monthly payment, which will be returned to them by the
Units, after they have done the payment of the
personnel, according to the regulations on the subject.

In all the above noted cases of errors discovery, the
automation office must be notified officially by the audi-
tors or the Units' cashiers, so that corrections of the
escaped errors will be done with the payment of the next
month. The correction of the escaped errors detected after-
wards, is usually a tedious process which can not be speci-
fied precisely in advance, it depends mainly on the nature of
the errors and may require writing of special procedures
(just to correct one error) to update the files with the
correct data, so that the next month the errors will be
corrected.

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VIII. PROGRAMS SPECIFICATIONS OF THE PAYROLL SYSTEM

A. LOGIC DIAGRAM OF THE SYSTEM

For the production of the monthly payment, we must run every `month the following programs (the first three in order) :

1. PS200 : This program sorts the changes by AFUN, and makes a preliminary check of the coded changes.

2. PS210 : This program checks extensively the coded changes, and verify their correctness and compatibility with the corresponding records of the Master file.

3. PS220 : The program updates the Master file and calculates the monthly salary of each person.

4. PS250 : The program prints the List of Payment by Unit, and the 'Statistical report' for the Accounting office.

5. PS260 : The program prints the List of Payment by AFUN.

6. PS270 : The program prints the Envelope of Payment by Unit.

7. PS280 : This program prints the List of Deductions by financial organization.

In Figure 8.1 below, we present the general logic diagram of the system, and following we describe the performed task and the logic of each program refered above and shown in the general logic diagram of the payroll system.
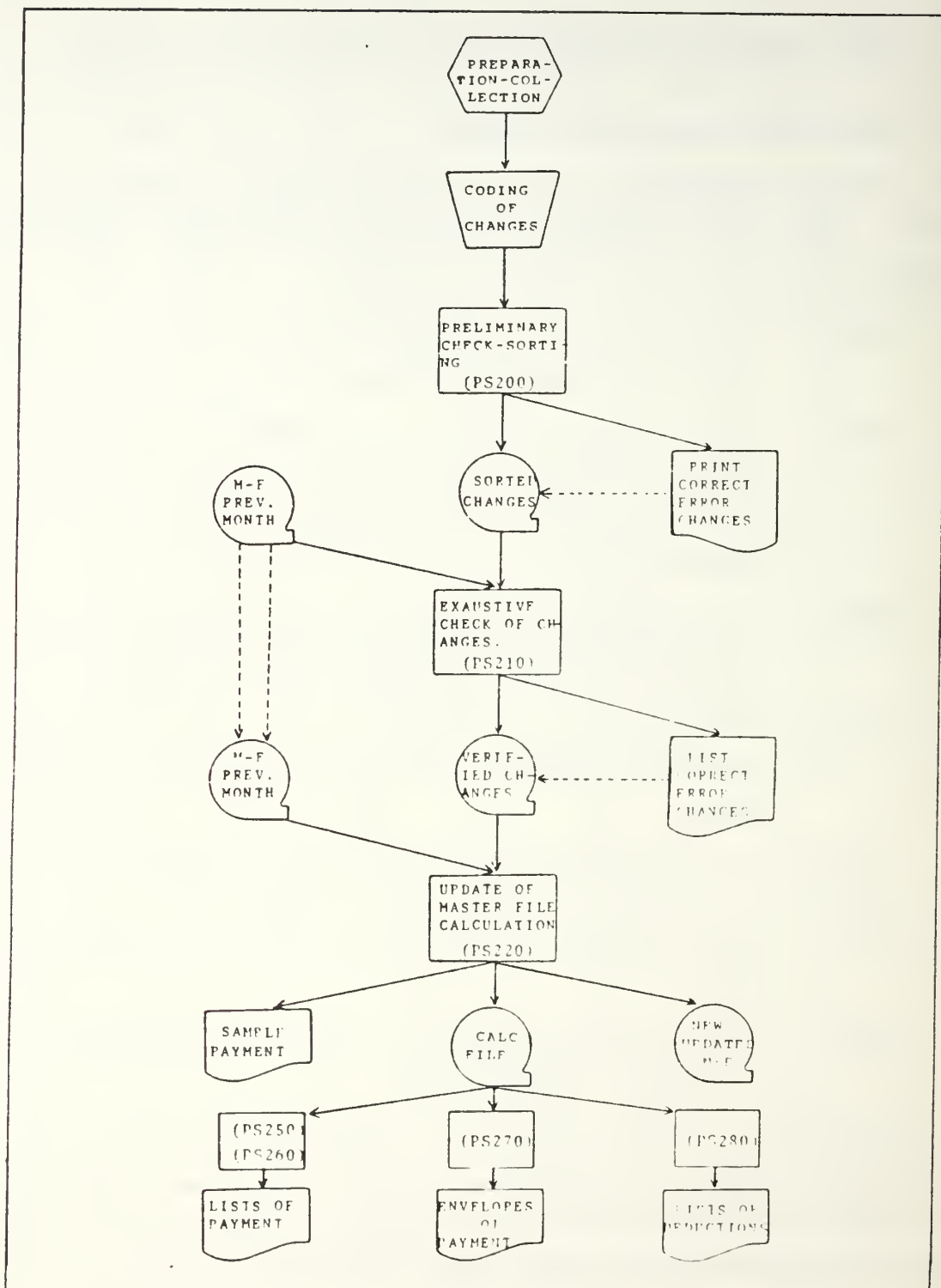
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Figure 8.1 General Logic Diagram of the System.

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B.   PROGRAM PS200

The purpose of this program is to sort the changes by
ascending AFUN, and make a kind of preliminary check of the
coded changes. The input used for this program consist of
three kinds of records (e.g. three kinds of cards) :

   a.   First Insertion Records,that is,records which intro-
        duce new persons to the system.
   b.   Monthly Changes Records,that is,records which modify
        or delete already existing records in the system's
        files.
   c.   Loans-Deductions Records,that is,records that report
        loans received by some persons already in the system.

1.   New Insertion Record

The New Insertion Reccrd used as input by this
program,consists of 74 characters, and so we may use a card
(80 characters) for each new insertion record.   This record
introduces a new person to the payroll system,and contains
all the necessary data to create a Master record for the
person,and start calculating his monthly salary.   The
detailed description of the fields contained in the 'New
Insertion Record' is shown in Figure 3.1.

2.   Monthly Changes Record

This record reports changes refered to already
existing records in the system's files. The record consists
of 32 characters,and so we may use a card for each record.
These changes are divided into two categories :

   1.   Changes of 'Invariant Elements' of the Master record.
        These are usually changes to the personal or family
        data,and are described in Table 12.
   2.   Changes of 'Variant Part' of the Master record. These
        are changes that affect the monthly salary of the

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person and make necessary the calculation of back track payment. Table 14 includes all these changes.

The detailed description of the fields of the 'Monthly Changes Record' is shown in Figure 3.2.

3. Loans-Deduction Record

This record reports to the system loans received by people already in the system, from the different financial organizations. These loans must be repayed on a monthly basis, by deducting the proper monthly amount for the repayment from their salary, and sending it to the particular financial organization.

This record consists of 33 characters and we may also use a card for each such record. The detailed description of the fields contained in the 'Loans-Deductions Record' is shown in Figure 3.3. This kind of change is refered to the 'Loans-Deductions' part of the Master record, the related financial activities of the persons, affecting this part of record, are included in the Table 13.

4. Run of Program PS200

The program reads the above described records, which are in a random order, following it sorts them by :

   a.   AFUN.
   b.   Date.
   c.   Refered part of Master record.
   d.   Kind Of Change.

The sorted file is written in a disk. From the disk the program reads the sorted records and performs the preliminary checking. Basically the program PS200 performs two kinds of check.
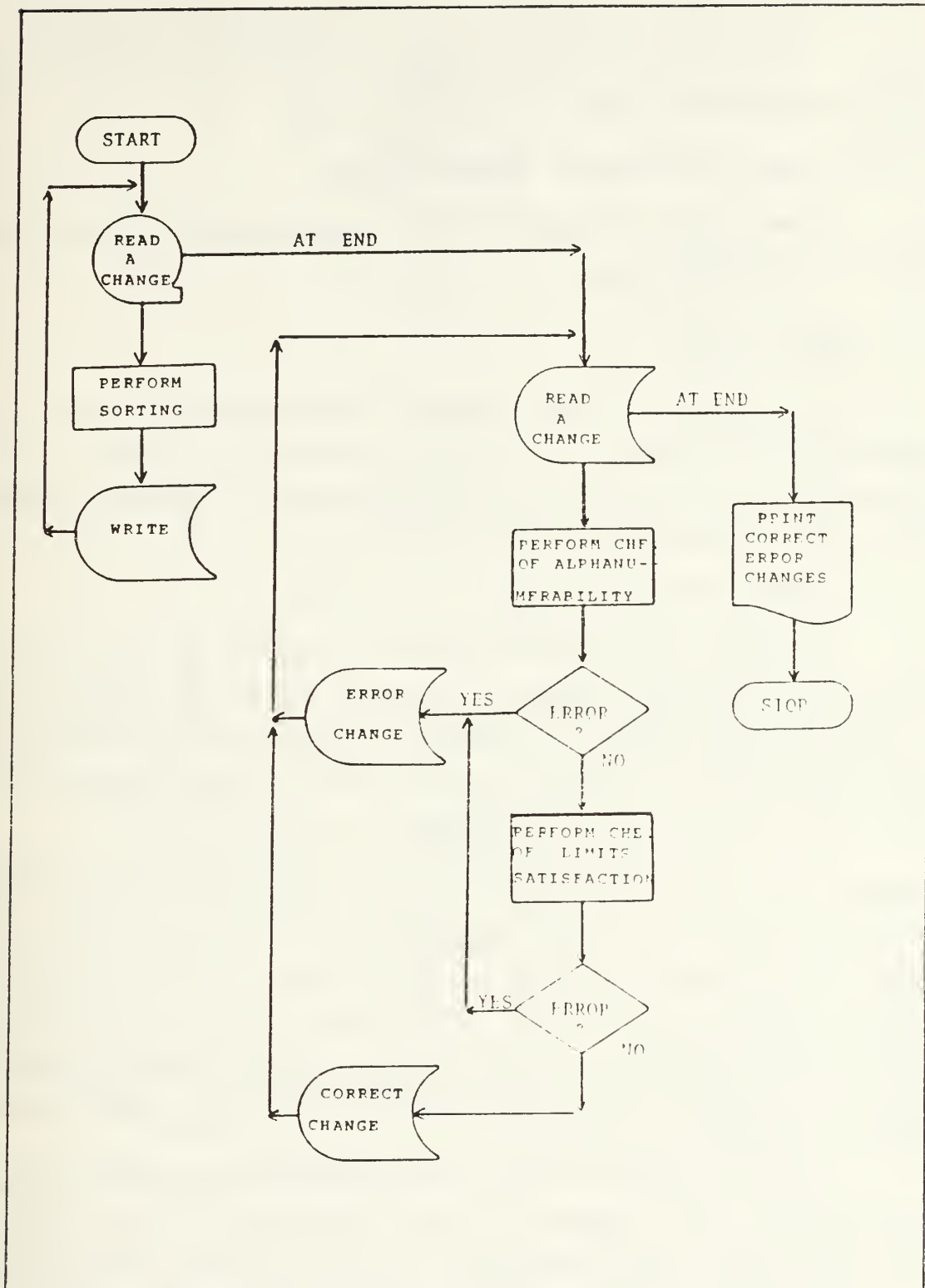
Figure 8.2 Logic Diagram of Program PS200.

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-. Checks the proper alphanumeric nature of the fields.

-. Checks the satisfaction of the predefined limits.

Finally,the program prints all the changes in a list and indicates the incorrect found changes.

5. Logic Diagram of Program PS200

The logic diagram of the program PS200 appears on Figure 8.2 above.

C. PROGRAM PS210

The purpose of the program PS210,is to check the correctness of coding of changes,done by the people at the automation office,and the compatibility of these changes with the corresponding Master records.

1. Run of Program PS210

The program reads the sorted records by the program PS200 above,it also reads the records from the Master file of the previous month. Following it checks if the record of change is refered to some person already in the system,or it is a new insertion to the system.

After the program determines that it is a change refered to a record already in the system,it checks the compatibility of the data reported by the change,with the data of the person in his Master record. At the end,the program prints a list with the correct and error changes. Of cause the people at the automation office should correct the errors,and run again the program,until all the changes will be reported as correct.

With the use of the two programs,PS200 and PS210,we have exhaustively checked all the changes of the month,we have established the correctness of coding,the satisfaction of the predefined limits,their proper alphanumerability and
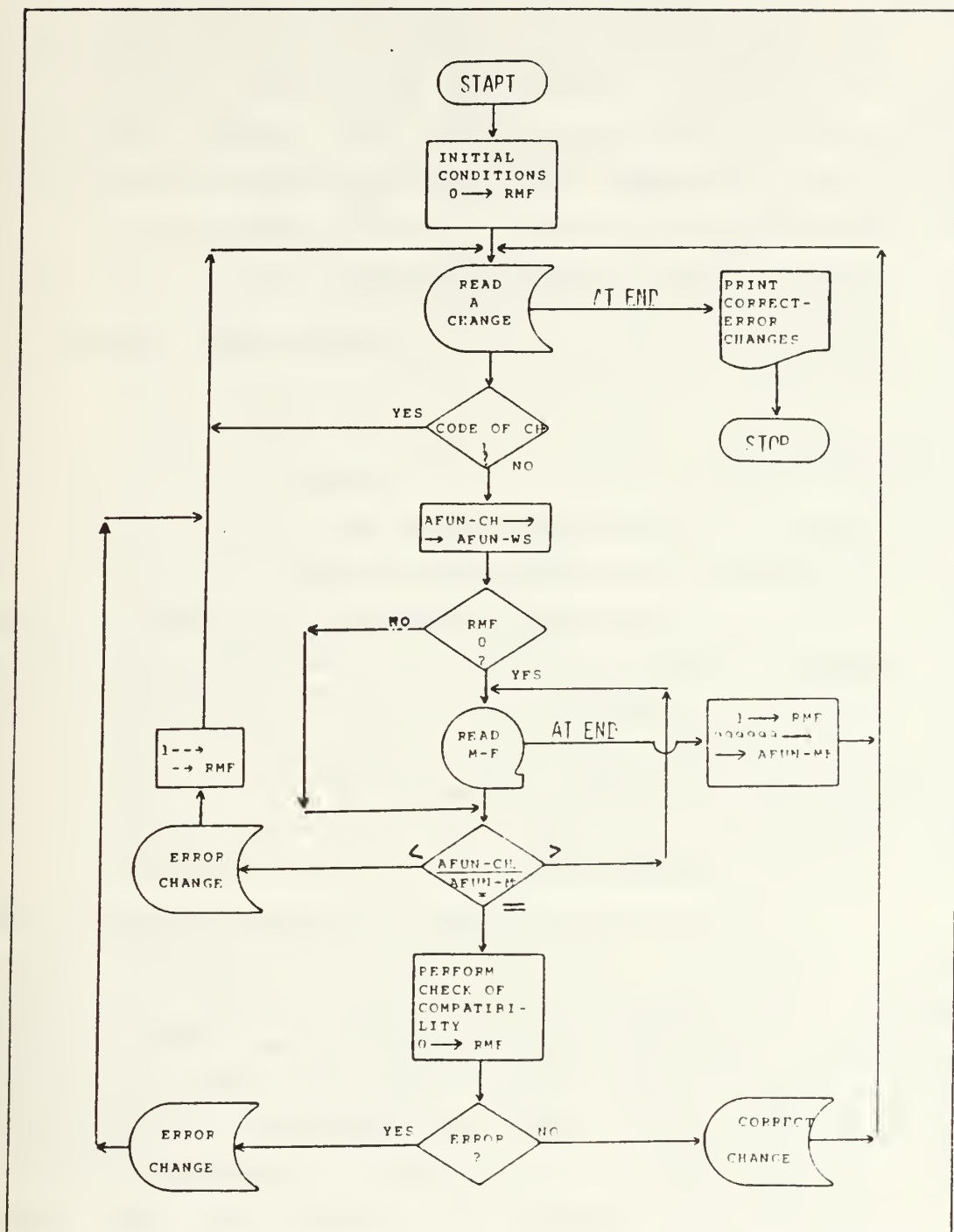
Figure 8.3   Logic Diagram of Program PS210.

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the compatibility with the corresponding data of the Master record, so we may consider them as fully validated.

The above checks will protect the reliability of the Master file, since no updates of the Master file will be attempted before the above checks, also these checks will prevent later unexpected mysterious outcomes, difficult to locate and correct.

2. Logic Diagram of Program PS210

The logic diagram of the program PS210 appears on Figure 8.3 above.

D. PROGRAM PS220

The purpose of the program PS220 is :
a. To create a new updated Master file.
b. To calculate the monthly salary of each person in the system, and write the entitled amounts and the resulting deductions in a file called CALC file (Calculation file).
c. To print the 'Sample Payment'.

1. Run of Program PS220

The program has as input the Master file of the previous month, and a sorted file of validated changes created by the program PS210, as it was described earlier. The output of the program is a new updated Master file, the 'Sample Payment' of the current month, and a new file called CALC file, which contains the calculated amounts of entitlements and deductions for each person in the system.

The program basically is divided into three logic entities :
a. First we update the Master file with the current changes. The update process of the Master

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file, includes creation of new records for new people into the system, update of the 'Invariant' part of the record, update of the 'Loans-Deductions' part of the record and finally update of the 'Variant' part of the record. The last case, as we repeatedly pointed out previously, creates the need to calculate back track payment for the persons with such changes.

b. Next we calculate the monthly salary of each person having an active record in the new updated Master file. We can further subdivide this phase, for better modularization of the system, into the calculation of salary of the unchanged people, the calculation of back track payment and the calculation of the current month salary, for people with back track payment. The calculated amounts of entitlements and deductions are stored in a file called CALC file.

c. The printing of the 'Sample payment'. The sample payment, as we noted in Chapter 7.C, includes only people with changes affecting their current salary and it is going to be used for audit control to prevent and protect, so doing, the final output from undetected until this phase errors.

2. Logic Diagram of Program PS220

The logic diagram of the program PS220 appears in Figure 8.4 below. The logic of the program is presented in system level, and we have skip over details which are mainly implementation dependent, and so not important for our level of design.
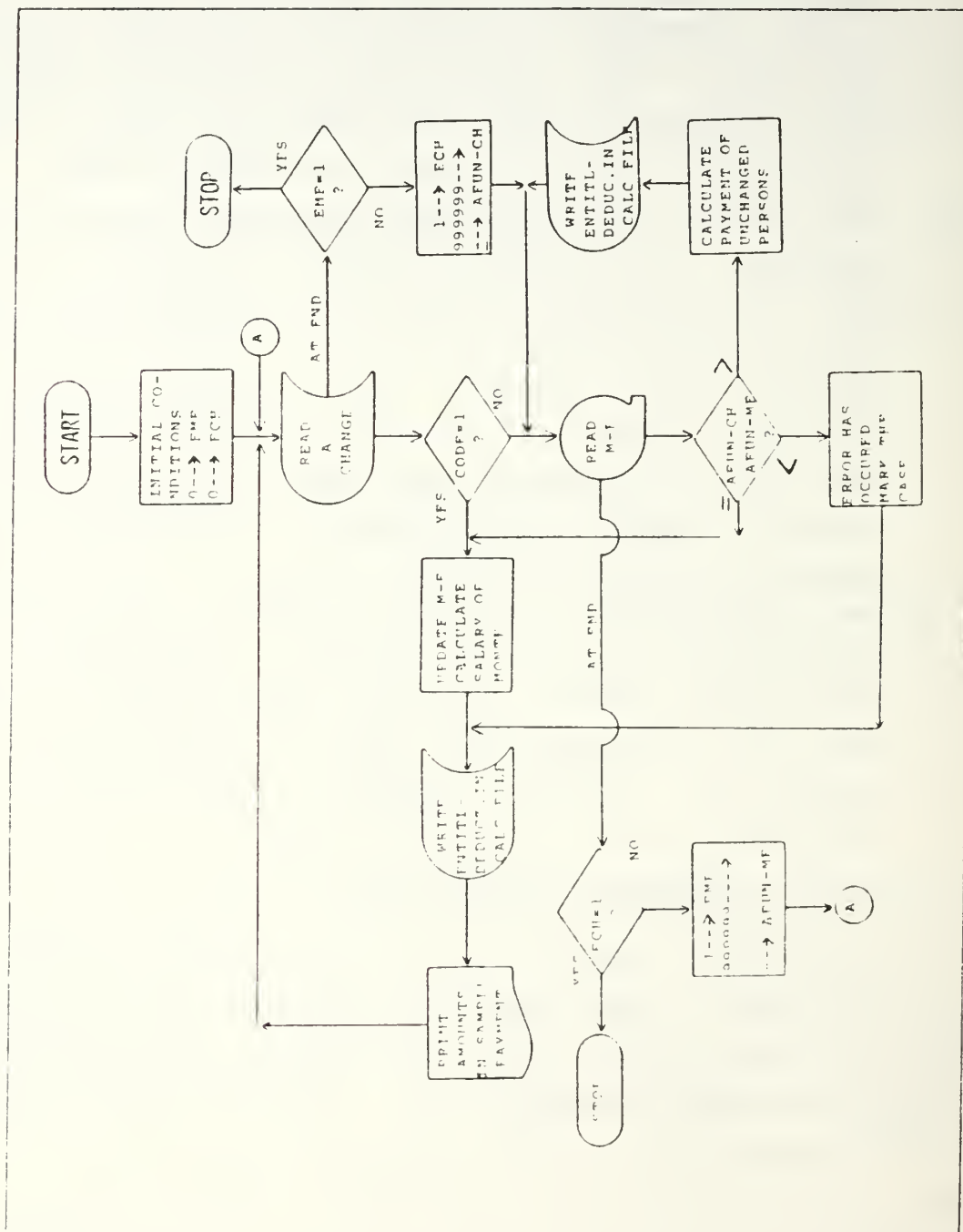
Figure 8.4 Logic Diagram of Program PS220

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However, some explanations will make it more read-
able, that is :
   a. EMF :   Is a flag which, if up, means the end of the
       Master file.
   b. ECH : Is also a flag which, if up, means that the end
       of the file with the changes has reached.
   c. AFUN-CH :   Is the Air Force Unique Number, reported
       by a record of the file containing the changes.
   d. AFUN-MF :   Is the same as above number, but reported
       by a record of the Master file.
   e. UPDATE M-F and CALCULATE PAYMENT :   Are actually
       subroutines which when called perform their task, but
       they are implemementation dependent at a lower level.

E.   PROGRAMS PS250-PS260-PS270-PS280

The purpose of the programs PS250, PS260, PS270 and PS280
is to provide the required output, as it was designed in
Chapter 5.

The program PS250 produces the 'Lists of Payment' by
Unit and the 'Statistical   Report' for the Accounting
office, PS260 prints the 'List of Payment' by AFUN, PS270
prints the 'Envelopes of Payment' by Unit and the program
PS280 prints the 'List of Deductions' by financial
institution.

1.   Run of Programs PS250-PS260-PS270-PS280

All the above programs work in the same fashion, the
only difference is that the output provided by each one, is
in accordance with the designed forms in Chapter 5, their
logic is the same, so we do not describe them separately.

The input used for these programs is the CALC file
created by the program PS220 above, this file is provided by
AFUN and contains the amounts of the entitlements and

deductions for each person. From this file we can produce all the required output,and print it in appropriate form. Since the CALC file is already sorted by AFUN,we can directly print the 'List of Payment' by AFUN using the program PS260.

Following,we give the logic diagram of program PS250,the logic diagrams for the rest of them,are the same at system level,they only differ at implementation level and their differences are quite obvious.

2. Logic Diagram of Program PS250

The logic diagram of the program PS250 appears in Figure 8.5 above. The program first sort the CALC file by :
 a. Unit -- Primary key.
 b. Rank -- Secondary key.
 c. Name -- Tertiary key.

After the file has been sorted,it prints the 'Lists of Payment' by Unit. At the end,it prints the 'Statistical report' for the Accounting office.

F. SYSTEM RELIABILITY - BACKUP

When information is kept in a computer system,a major concern is its protection,from both physical damage and improper access. Reliability is generally provided by making duplicate copies of files. It is a good idea to save the files of the system every month,this consists of copying all files to magnetic tape.

This provides a backup copy in case of system failure or if the file is no longer in use. In this case,the file can be copied to tape and the disk space of that file released for reuse by another file. The backup tapes of each month can be kept at a safe place for as long as it might be necessary.
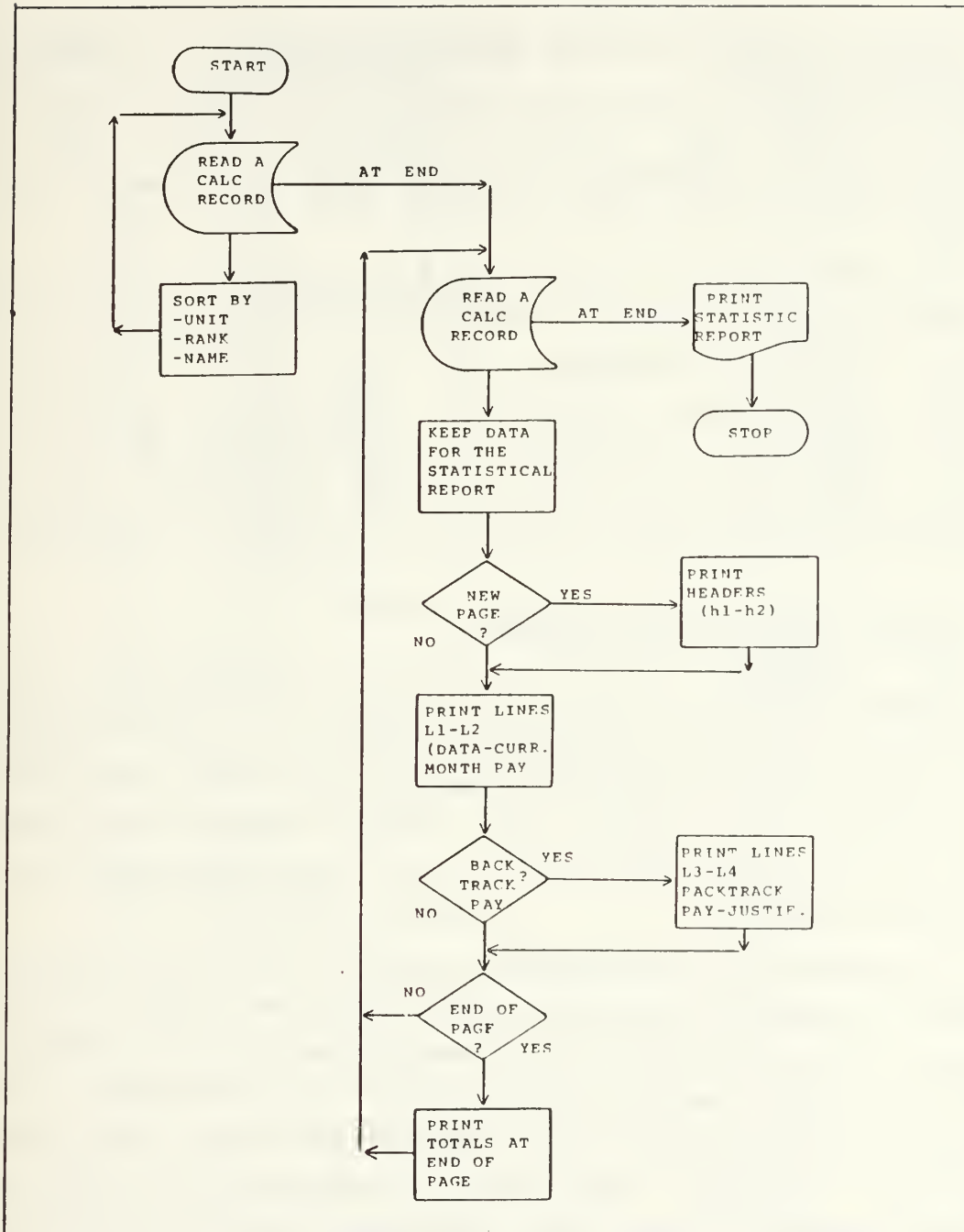
Figure 8.5 Logic Diagram of Program PS250.

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IX. RECORDS SPECIFICATIONS

In the previous chapter,we have specified the programs that will implement the automation of the monthly payment in system design level. Also,we described the run of the programs,their interaction, and the used input and provided output.

In this chapter we specify the records used by the programs of the system,for keeping information or providing data for further processing. The following descriptions of records are language independent and can be implemented using corresponding structures of any convenient programming language,also they are flexible and expandable allowing additions and deletions of fields,as it might be required.

A. MASTER RECORD SPECIFICATION

Master records are those contained in the Master file of the system. Master file is a historic file,keeping every month information about the occuring changes in the data of any person in the system. This file is updated every month with the new changes,and it is used for the calculation of the monthly salary.

A backup copy of the Master file of every month could be useful for safety and recovery,in case of a system crash. Also it might be useful as documentation for the payment of each particular month, because the data contained in the Master records justify the calculated salary of every person for that particular month,so the contents of the file can answer questions that might arise in later time,about the calculated entitlements and deductions,of any person in the system. The specification of the Master record could be as the description included in Table 10 below.

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TABLE 10

Master Record Description

LEVEL	DESCRIPTIVE NAME OF THE FIELD	NAME IN PROGRAMS	*FIELD *LENGTH
01	Master Record	M-REC	134
02	Invariant Part Of The Record	M-INV	58
03	Air Force Unique Number	AFUN-M	6
03	Unit	M-UNIT	4
03	Received Salary	M-RS	1
03	Rank	M-RANK	2
03	Full Name	M-FLNM	23
04	Last Name	M-LNAME	20
04	First Name	M-FNAME	2
04	Middle Name	M-INIT	1
03	Category	M-CAT	2
03	Specialty	M-SPEC	2
03	Year Completion Date	M-YCD	6
04	Year	M-YRCD	2
04	Month	M-MCD	2
04	Day	M-DCD	2
03	No.Of Years In Service	M-YSV	2
03	Way Of Insertion In Service	M-WAY	1
03	Family Status	M-FSTAT	3
04	Married	M-MAR	1
04	Children	M-CH	1
04	Dependent Parents	M-DEP	1
03	Meb.In Milit.Housing Assoc.	M-MBR	1
03	Account No.In Mil.Hous.Ass.	M-AMHA	5
02	Loans-Deductions Part	M-LDP	19
03	Code Of Financ.Institution	M-CFI	2
03	Monthly Amount	M-AMT	5
03	Total Amount Of Lcan	M-TOT	6
03	Account Number	M-ACCN	6

TABLE 10
Master Record Description (Cont'd.)

02	Variant Part Of Record	M-VAR	15
03	Promotion	M-PROM	2
03	Financial Promotion	M-FPRM	2
03	TDY	M-TDY	1
03	Technical Allowance	M-TECH	1
03	Family Support Allowance	M-FAM	1
03	Time Percentage	M-TP	2
03	Restricted Payment	M-PAY	1
03	Children's Plan	M-CHP	1
03	Danger Jobs Allowance	M-DGR	2
03	Retirement	M-RET	1
03	Recall In Active Duty	M-RCL	1
02	Annual Income Certificate	M-CERT	42
03	Sum Of Entitlements	M-ENT	7
03	Annual Common Share Fund	M-COSH	5
03	Annual Military Housing	M-ANMH	5
03	Annual Amount For Loans	M-ALOA	6
03	Annual State Tax	M-STAX	5
03	Annual Sum Of Deductions	M-ASDE	7
03	Net Annual Payment	M-ANPM	7

B. CALC RECORD SPECIFICATION

Calc records are those contained in the Calc file of the system. Calc file is a file created by the program PS220,it contains the data of each person in the system and the calculated amounts of entitlements and deductions.

This file is used by the production programs of the system to provide the required output in the appropriate form. A backup copy of the Calc file of every month,could be useful for the same reasons reported for the Master file previously. The specification of the Calc record could be as the description appearing in Table 11 below.

C. OTHER RECORDS

During the implementation of the system will be necessary to create and use more files and records. The above described two files and their corresponding records (Master record and Calc record),are the backbone of the system and provide global services. We can mention here again the following locally used records.

1. New Insertion Record

This record is used to report a new person to the payroll system, it contains all the necessary data to create a Master record for him,and start calculating his monthly salary. A description of this record appears in Figure 3.1.

2. Monthly Changes Record

This record reports every month changes refered to already existing persons in the system. A description of the fields of this record is shown in Figure 3.2.

TABLE 11

Calc Record Description

LEVEL	DESCRIPTIVE NAME OF THE FIELDS	NAME IN PROGRAMS	*FIELD *LENGTH
01	Calc Record	CALC-R	170
02	Invariant Part Of The Record	C-INV	49
03	Air Force Unique Number	C-AFUN	6
03	Unit	C-UNIT	4
03	Rank	C-RANK	2
03	Full Name	C-FLNM	23
04	Last Name	C-LNAME	20
04	First Name	C-FNAME	2
04	Middle Name	C-MINIT	1
03	Specialty	C-SPEC	2
03	Category	C-CAT	2
03	Year Completion Date	C-YCD	6
04	Year	C-YCD	2
04	Month	C-MCD	2
04	Day	C-DCD	2
03	Way Of Insertion In Service	C-WAY	1
03	Family Status	C-FSTAT	3
04	Married	C-MAR	1
04	Children	C-CH	1
04	Dependent Parents	C-DEP	1
02	Service Status	C-SVST	13
03	Received Salary	C-RS	1
03	No.Of Years In Service	C-YSV	2
03	Technical Allowance	C-TECH	1
03	Cashier's Allowance	C-CASH	1
03	Unhealthy Cond.Allowance	C-UNH	1
03	Family Support Allowance	C-FAM	1
03	Time Percentage	C-TP	2
03	Restricted Payment	C-PAY	1

TABLE 11
Calc Record Description (Cont'd.)

03	Danger Jobs Allowance	C-DGR	2
03	TDY	C-TDY	1
02	Loans Part	C-LOANS	19
03	Code Of Financ. Institution	C-CFI	2
03	Monthly Amount	C-AMT	5
03	Remaining Balance	C-BLNC	6
03	Account Number	C-ACCN	6
02	Total Amount For Loans Deducted This Month	C-TLA	6
02	Calculation Area	C-CAREA	41
03	Amount Of Basic Salary	C-BSAL	6
03	Amount Of Time Percentage	C-CTP	5
03	Amount Of Danger Jobs All.	C-CDGR	5
03	Amount Of Tech.Allowance	C-CTCH	5
03	Amount Of TDY	C-CTDY	5
03	Amt.Of Unhealthy Cond.All.	C-CUN	5
03	Amt.Of Cashier's Allowance	C-CCASH	5
03	Amt.Of Family Support All.	C-CFAM	5
02	Sum Of Entitlements	C-SUM	6
02	Deductions	C-DED	24

```
                            TABLE 11
                 Calc Record Description (cont'd)

      03        Amount Of State Tax           C-TAX      5

      03        Amt.For Common Share Funds    C-CSHF     5

      03        Amt.For Military Housing       C-MHOUS    5

      03        Amt.For Military Magazines    C-MAG      3

      03        Amount Due To Cashier         C-LCASH    6

   02           Sum Of Deductions             C-CDED     6

   02           Net Amount Of Payment         C-CNET     6
```

3. <u>Loans</u> - <u>Deductions</u> <u>Record</u>

This record reports to the system loans received by people already in the system,from the various financial institutions or the Unit's cashier. A description of this record appears in Figure 3.3.

X. CONCLUSION - COMMENTS

Designing software systems is an activity that demands much intellectual capacity. Completing an efficient,reliable,and maintainable system on time is often an even more herculean task. The main reason of the difficulty is the complexity of solutions,and the inability to deal with the complexity of solutions. This is also the ultimate cause of the software crisis that we face today.

Even as early as 1965 Dijkstra recognized the essence of the problem when he said "I have only a very small head and must live with it" [Ref. 1]. W.A.Wulf stated it more concisely when he said "it is our human limitations,our inability to simultaneously deal with all the relations and ramifications of a complex situation,which lies at the root of our software problems" [Ref. 2].

It seems then,that the ultimate solution to the underlying problem of systems design and software crisis,namely,our human limitations,lies in the application of modern software methodologies supported by a high-order language that encourages and enforces these principles.

In our effort here,we have tried to follow the principles of software engineering and approach our subject in a disciplined way. We have realized that system design like any engineered articraft, goes through a life-cycle of birth,growth,maturation and death. In the case of systems,the terms analysis,design,construction,and evolution are typically used to describe the phases of this life-cycle.

Our primary purpose of the first stages of development was to understand the problem,understanding for us means determining the various parts of the problem,not only in technical terms,but in human and organizational terms.

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We proceeded next with the analysis of factors that affect our system and we provided a simple and smooth flow of information from the sources of creation to the automation office, where the information is transformed and used as input to the system.

In order to prevent transient information, we designed very specific reports and we defined the way of their completion by the sources, also we specified the way that the information is transformed to meaningful input the system. Time constraints where established in order to avoid timeliness or less than expected capabilities.

Next we designed the output of the system and we specified the programs, the files, the records and the order of runs that will provide the required output, meanwhile through carefully designed procedures we have verified the quality of the input and output.

Being aware of the high cost needed for system maintenance (corrective, perfective, and adaptive to changing needs), we have designed it with maintenance in mind, so we tried to modularize the system so that each module does one well defined task or small number of related tasks. Also each module is ease to use, because its low knowledge requirements.

We have tried to modularize the system in a way so that a change in one module does not require changes in many others, also we can add parts or remove unneeded parts without affecting the remainder. Finally our overall designs can be easily extended, that is, add new capabilities without major modifications of existing designs.

Since it is still not clear how much one can formalize the system design process, and system designers have indicated a wide variation in their design styles and approaches, my final thought-comment is that a large system is going to be based on people and operated by people, so it

is natural some of them will be "good people" and others "less-good people",the key to good system design lies in getting the best out of "good people",and in structuring the job so that the "less-good people" can still make a positive contribution.

Our design here is influenced by the above philosophy,which we believe reflects the real world we face every day,so we have tried hard to keep the designs as simple as possible,and to create a usable system where every one can participate and make his positive contribution.

APPENDIX A
MONTHLY INFORMATION FOR CODING

In this appendix we have included all kinds of information that is possible to arrive at the automation office,by means of the three reports,which provide all the information necessary to the payroll system.   This information must be coded appropriatly,in order to become meaningful to the payroll system,which will use it to update the files and for further processing.

Following we show the information arriving at the automation office and the assigned code number which characterizes each one of them,also we indicate the sources which generate the information,for quick reference whenever it is required.

SORT DESCRIPTION	CODE NO.	SOURCE OF INFO
New insertion	01	Units
Recall in a year different of retirement	01	Units
AFUN	05 01	Personnel-Units
New assignment	05 04	Units
Name	05 13	Personnel-Units
Category	05 14	Personnel-Units
Specialty	05 15	Personnel-Units
Wife	05 23	Units
Children	05 24	Units
Protected parents	05 25	Units

Membership in military housing association	05 72	Units-assoc.
Military magazines	05 74	Units
Air force exchange	08 01	Units-exch.
Air force loans	08 02	Units-exch.
Army exchange	08 04	Units-exch.
Navy exchange	08 05	Units-exch.
Bank of Greece	08 15	Units-bank
Athens credit union	08 16	Units-bank
Commercial bank	08 17	Units-bank
Promotion to next rank	11	Personnel-units
Financial promotion	12	Finance
Percentage depending on years in service	13	Finance
Technical allowance	23	Units-Personnel
Danger-Unhealthly jobs allowance	14	Units-Personnel
Family support allowance	25	Units
Restricted payment	51	Units-Personnel
Children's plan	54	Units
Travel duty allowance	80	Units-Personnel
Recall in active duty in same year of retirement	98	Units
Retirement	99	Units

APPENDIX B
GROUPING OF DATA AND CODING

Here for better organization of the data,which are needed for the production of the monthly payment,also for reference and easy of use,we have grouped the information into three entities.

a. Elements of the Invariant Part of Record

In the first group,we have information which refers to the 'invariant' part of the record,as it was described in Chapter 4,(see Chapter 4.A.1). This means that if we have changes in this group of data,it is not necessary to calculate backtracking payment,by this we imply to calculate the payment from some date in the past and make adjustments. In Table 12 we include this kind of data and the code number which specify each one and the corresponding field length in the record.

b. Elements of the Loans Part of Record

In the second entity,we have put the data which are created from the financial activities of every particular person,the corresponding part of the record may be empty for some people in the system without such activities,and in any case the information here does not create the need to calculate backtracking payment,when we have changes here,(see Chapter 4.A.2). In Table 13 we show some such activities and the provided coding.

c. Elements of the Variant Part of Record

Finally in the third group,we have put the data which,if changed, always create the need to recalculate the

TABLE 12

Elements Of Invariant-Part Of Record

SHORT DESCRIPTION	CODES INV = CHANGE		FIELD LENGTH
AFUN	05	01	6
New assignment	05	04	4
Name	05	13	23
Category	05	14	2
Specialty	05	15	2
Wife	05	23	1
Children	05	24	1
Dependent parents	05	25	1
Membership in military housing association	05	72	6
Military magazines	05	74	1

payment from some date in the past and make appropriate adjustments,between the already done payment for that period and the correct one,under the current information,(see Chapter 4.A.3).

As an example of this group lets examine a promotion which is effective frcm a date two or more months in the past time. The above information,make it necessary to calculate the payment from the effective date of promo- tion,until the current date,tc subtract whatever we have already payed to him,for that period,and to give the differ- ence with the next payment. In Table 14 we have included all these data and the assigned code numbers which characterize them.

TABLE 13

Elements Of Loans-Part Of Record

SHORT DESCRIPTION	C O D E S	
	LOAN	ORGAN.
Air force exchange	08	01
Air force loans	08	02
Army exchange	08	04
Navy exchange	08	05
Bank of Greece	08	15
Athens' credit union	08	16
Commercial bank	08	17
National bank	08	18
Milit. Housing Ass.	08	20
Common Share Fund	08	22

These tables,and any future expansion of them,must be used in the automation office to convert the arriving verbal changes,through the three reports, into corresponding coded changes,in order to make them meaningful to the underlying system,which finally through processing will provide the payment of each month.

TABLE 14

Elements Of Variant-Part Of Record

SHORT DESCRIPTION	CODE OF CHANGE	LENGTH OF FIELD
Promotion to next rank	11	2
Financial promotion	12	2
Percentage depending on years in service	13	2
Danger-Unhealthy jobs allowance	14	2
Technical allowance	23	1
Family support allowance	24	1
Restricted payment	51	1
Children's plan	54	2
Travel duty allowance	80	1
Recall in active duty within the year of retirement	98	1
Retirement	99	1

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